



09/485,097

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Mathiesen	Examiner:	J. Goff II
Serial No.:	09/485,097	Group Art Unit:	1733
Filed:	March 8, 2000	Docket No.:	12875.10USWO
Title:	METHOD OF MANUFACTURING A COMPOSITE MATERIAL		

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited in the United States Postal Service, as first class mail, with sufficient postage, in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 29, 2004.

By:
Name:

Kristine A. Waceh
Kristine A. Waceh

APPELLANT'S BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

23552

PATENT TRADEMARK OFFICE

Sir:

This Brief is presented in support of the Notice of Appeal filed February 18, 2004, from the final rejection of claims 1-14 of the above-identified application, as set forth in the Office Action mailed October 15, 2003.

A check for \$165.00 to cover the required fee for filing this Brief is enclosed. An original and two copies of the Brief are enclosed herewith.

I. REAL PARTY IN INTEREST

The Real Party in Interest is KE-Burgmann A/S, a corporation of Denmark.

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II. RELATED APPEALS AND INTERFERENCES

The Appellant is not aware of any related appeals or interferences for the above-referenced patent application.

III. STATUS OF CLAIMS

Claims 1-14 are pending and are the subject of this Appeal. Claims 1-14 have been finally rejected under 35 U.S.C. § 103(a).

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection from which this appeal is taken.

V. SUMMARY OF THE INVENTION

The invention relates to a method of manufacture of a composite product comprising at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil and the composite product produced by the method. The invention further relates to an apparatus for the manufacture of the composite material. The laminating step is carried out at approximately 380 to 400 °C under a pressure of 0.1 to 20 N/mm², and the laminated foil and woven material is also cooled under pressure from about 300 to 420 °C to about 50 °C in about 0.1 to 240 seconds.

VI. ISSUES PRESENTED FOR REVIEW

1. Whether claims 1-10 and 14 are unpatentable under 35 U.S.C. § 103(a) over Japanese Patent No. 52-6782 to Sumitomo (hereinafter "Sumitomo") in view of U.S. Patent No. 2,833,686 to Sandt (hereinafter "Sandt") and German Patent No. 4,202,920 to Smuck et al. (hereinafter "Smuck").
2. Whether claims 11-13 are unpatentable under 35 U.S.C. § 103(a) over Smuck.

VII. GROUPING OF CLAIMS

1. Claims 1-10 and 14 form one grouping for purposes of this appeal.
2. Claims 11-13 form a second grouping for purposes of this appeal.

The claims are contained in Appendix 1.

VIII. ARGUMENT

A. INTRODUCTION

Claims 1-14 have been finally rejected under 35 U.S.C. § 103(a). Appellant respectfully submits that the rejections are in error on at least the following grounds: (1) Applicant's invention is not disclosed in the cited references; (2) there is no suggestion to make the proposed combination of references; (3) the prior art teaches away from Applicant's invention; and (4) even if combined, the proposed combination of references would render the prior art inoperable for its intended purpose.

B. AUTHORITIES

To make out a *prima facie* case of obviousness under 35 U.S.C. § 103(a), there must exist some motivation, either generally available to one of ordinary skill in the art or expressly stated in the prior art, to modify the known prior art to arrive at the claimed invention. For a 35 U.S.C. § 103(a) rejection, the Examiner should set forth in the Office Action:

- (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,
- (B) the difference or differences in the claim over the applied reference(s),
- (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and
- (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the modification.

M.P.E.P. § 706.02(j) (2003). In order to establish *prima facie* obviousness under 35 U.S.C. 103(a), three basic criteria must be met: (1) there must be some suggestion or motivation to combine the references or modify the reference teaching; (2) there must be a reasonable expectation of success; and (3) the reference or references when combined must teach or suggest each claim limitation. 35 U.S.C. 103(a). Only once the Examiner has established a *prima facie* case of obviousness does the burden shift to the Applicant to present evidence of nonobviousness.

A *prima facie* case of obviousness must be supported by a showing that some objective teaching in the prior art would lead that individual to combine the relevant teachings. In re Fine, 837 F.2d 1071, 1074 (Fed. Cir. 1988). References can be combined only if there is some teaching or suggestion supporting the combination. Id. at 1075. The teaching or suggestion to make the proposed combination must be found in the prior art, not from Applicant's disclosure or claims. In re Vaeck, 947 F.2d 488, 493 (Fed. Cir. 1991). If the prior art has not suggested the desirability of the combination, the mere fact that the prior art may be modified in the manner

suggested by the Examiner does not make the invention obvious. In re Fritch, 972 F.2d 1260, 1266 (Fed. Cir. 1992).

Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art. Bausch & Lomb, Inc. v. Barnes-Hind Hydrocurve, Inc., 796 F.2d 443, 448 (Fed. Cir. 1986). Rather, the claimed invention as a whole must be considered in obviousness determinations. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1537 (Fed. Cir. 1983). Further, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981 (C.C.P.A. 1974).

In addition, there is no suggestion or motivation to combine prior art if the proposed combination would render the prior art inoperable or unsatisfactory for its intended purpose. In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984). Further, a *prima facie* case of obviousness is not made when a proposed combination of prior art references would change the principle of operation of the prior art being modified. In re Ratti, 270 F.2d 810, 813 (C.C.P.A. 1959).

C. BRIEF DISCUSSION OF SUMITOMO, SANDT, AND SMUCK

Sumitomo discloses a method for producing of a 4 ethylene fluoride resin sheet. Sumitomo discloses laminating thin PTFE films and sintering them together at an elevated temperature of 390 °C and a pressure of 10 Kg/cm² for 10 minutes. Sumitomo further discloses thin sheets of 0.05 to 0.1 mm. Sumitomo does not disclose rapid cooling or simultaneous application of pressure. In fact, Sumitomo states, "In order to prevent the warping and the bending of the sheet, said sheet is preferably gradually cooled after sintering has been completed." (Sumitomo translation at 3, ll. 16-17.)

Sandt discloses a lamination process for a modified PTFE film. Sandt discloses slow cooling to temperatures from about 380 °C to below 280 °C under pressure. Sandt does not disclose a rapid cooling process. Sandt discloses "cooling is done gradually so as to minimize the chance for bond rupture as a result of unequal contraction of the assembly during this step" and suggests a time in one instance of "several hours." (Sandt col. 1, ll. 38-42; col. 3, ll. 2-3.) In one of the examples, Sandt discloses cooling of "two hours." (Sandt col. 5, l. 4.) Further, Sandt does not disclose a process for cooling "virgin" PTFE films, instead focusing only on modified PTFE.

Smuck discloses a continuous lamination, where endless bands contact each side of the laminate, with pressure and cooling stations successively arranged. Smuck offers a product and process, an embodiment of which heats the laminate by use of two hot roller pairs and cools the same by use of cold roller pairs. Smuck does not disclose a lamination process that can be used for sintering. Smuck does not disclose that pressing and cooling are carried out simultaneously and Smuck does not disclose the use of a fixation means. Smuck cites prior art that "exhibited the disadvantage" of "the application of pressure" and again cites to the prior art that had the "disadvantage" of pressure, "which leads to a laminating effect of poor quality." (Smuck translation at 5, ll. 14-16; Smuck translation at 9-10, ll. 19-26, 1-6.) Smuck discloses that an advantage of the Smuck invention is that "an application of pressure" "is essentially avoided." (Smuck translation at 6, ll. 10-11.)

D. CLAIMS 1-10 AND 14

Claims 1-10 and 14 were rejected under 35 U.S.C. § 103(a) over Sumitomo in view of Sandt and Smuck. Claims 1 and 9 are independent claims. Appellant respectfully submits that

these claims are patentable over the combination of Sumitomo in view of Sandt and Smuck as applied to claims 1 and 9. Claims 2-8, 10, and 14 depend on these claims, and are also patentable.

1. Cooling Time

A short cooling time is not discussed in any of the cited references. Claim 1 recites cooling "under pressure from about 300 to 420 °C to about 50 °C in about 0.1 to about 240 seconds". The Examiner has failed to establish a *prima facie* case of obviousness because the references fail to teach all of the claim limitations, specifically there is no disclosure or suggestion regarding the time in which cooling takes place.

In Sumitomo, the lamination process has a long process time and no cooling process is described. Certainly, therefore, it cannot be said that a rapid cooling process with simultaneous application of pressure is disclosed.

The cooling that is disclosed in Sandt is slow and the laminate is only cooled from about 380 °C to below 280 °C within 15 minutes (900 seconds). The laminate may shrink during such a slow cooling and when the pressure is released, the laminate may wrinkle during subsequent cooling. The lamination material described in Sandt is a modified PTFE having a different cooling response than "virgin" PTFE films. This modified PTFE requires a special lamination process that is not applicable if virgin PTFE films are to be laminated.

Smuck does not disclose simultaneous pressing and cooling. Smuck describes a continuous lamination, where endless bands contact each side of the laminate, with pressure and cooling stations successively arranged. The bands have an insulating effect making the cooling less efficient.

None of the references, or combination of references, teach that the cooling is carried out in about 0.1 to about 240 seconds. The references either fail to specify cooling time or disclose a long cooling time. Based on the cited references, or combinations thereof, one of skill in the art would not have been motivated to utilize a rapid cooling because the only cooling conditions that are specified by any of the references are extended times. Indeed, based on the thickness and makeup of the films disclosed in the prior art, there is no suggestion that rapid cooling would be effective. The rapid cooling that the Applicant utilizes offers advantages in that the laminate material is fixed quickly and any risk of further shrinking and wrinkling is eliminated. If one of skill in the art were to utilize the cooling of Sumitomo, Smuck, Sandt, or some combination thereof, the laminate would still have a soft structure, which would allow it to shrink and wrinkle upon further cooling.

The cited references actually teach away from the rapid cooling of Applicant's invention, thus one of skill in the art would not have been motivated by the prior art to obtain Applicant's invention. Sumitomo does not teach the rapid cooling of Applicant's invention. Not only does Sumitomo not disclose the rapid cooling utilized in the Applicant's invention, it actually teaches away from. Sumitomo states, "In order to prevent the warping and the bending of the sheet, said sheet is preferably gradually cooled after sintering has been completed." (Sumitomo translation at 3, ll.16-17.) Likewise, Smuck does not disclose rapid cooling, disclosing no time or temperature for a cooling process. Sandt also does not teach the rapid cooling that is recited in the claimed invention. Sandt also teaches away from such rapid cooling, stating that "cooling is done gradually so as to minimize the chance for bond rupture as a result of unequal contraction of the assembly during this step" and suggests a time in one instance of "several hours." (Sandt col. 1, ll. 38-42; col. 3, ll. 2-3.) In one example, Sandt discloses a cooling time of "two hours."

(Sandt col. 5, l. 4.) Therefore, one of skill in the art, considering the cited references, would not have obtained the Applicant's invention, and would have actually been taught against Applicant's invention by overwhelming admonitions regarding problems created by rapid cooling.

The laminate produced by the cited references is also quite different from Applicant's invention. Because of the different process used in Sumitomo, Sandt, and Smuck, the laminate that is obtained is therefore a completely different type of laminate than the composite laminates obtained by the present invention.

In summary, none of the cited references, or combinations thereof, disclose or suggest a rapid cooling time like that recited in claims 1 and 9. In fact, the cited references teach away from a rapid cooling process like that recited in claims 1 and 9. Because the combination of the references fail to teach or suggest Applicant's invention, Applicant respectfully requests that this rejection be withdrawn.

2. Temperatures

Furthermore, the temperatures used in Applicant's invention are not disclosed or suggested by the cited art. None of the cited references, or combinations thereof, disclose or suggest cooling from about 300 to 420 °C to about 50 °C while maintaining pressure during the cooling process. Sumitomo does not give a specific final temperature of the cooling. Sandt discusses cooling under pressure to below 280 °C (Sandt col. 3, ll. 41-45), or in air to below 300 °C (Sandt col. 4, ll. 12-15). Both Sumitomo and Sandt teach that the cooling is gradual and does not go down to between 300 to 280 °C. Neither discloses or suggests cooling to about 50 °C.

Smuck likewise fails to disclose beginning temperatures as high as those used by Applicant. The temperatures disclosed in Smuck (150 to 250 °C) (Smuck translation at 13, l. 8) are too low to allow Applicant's invention to work. Further, Smuck neither discloses nor

suggests fixation and rapid cooling from a high sintering temperature in Applicant's invention (300 to 420 °C) to a temperature below 50 °C. The Examiner has not stated a motivation generally available to one skilled in the art to utilize Smuck's process to sinter the materials. There is no motivation for requiring the process to be run at significantly higher temperatures, and the Examiner has cited none. Because the process disclosed in Smuck does not disclose the process of Applicant's invention, the process disclosed in Smuck cannot disclose the method of manufacture or the product claimed.

None of the cited references go as low as 50 °C. None of the references start at high enough temperatures. A person of skill in the art certainly would not have been motivated to pick a higher starting temperature and lower finishing temperature if it was not disclosed in any of the references. Therefore, none of these disclosures would motivate one of skill in the art to utilize a cooling step from about 300 to 420 °C to about 50 °C in 0.1 to 240 seconds.

3. Film

The processes disclosed in the cited references would not work with applicant's invention because of the differences between the prior art and Applicant's film thickness, and the rapid cooling, temperatures used, and pressure used in the process because of the film thickness.

Sumitomo does not disclose a process of laminating PTFE where the laminated foils are sintered by heating. The Sumitomo process is slow and only suitable for very thin films. The composite material in the present invention is at least partly fixed during the cooling. Furthermore, the cooling in Applicant's invention is carried out quite rapidly compared to the Sumitomo method. In Applicant's invention, the effect of fixing the material by applying pressure makes it possible to carry out the rapid cooling without risking any critical shrinkage, warping, or bending. In the

present invention, the lamination may be carried out with PTFE-foils with a thickness of 0.5 to 1.5 mm, whereas the foils in Sumitomo are 0.05 to 0.1 mm in thickness.

Combining Sumitomo with Sandt and Smuck does not remedy the noted defects. Smuck discloses a process for "thin-layered film material," touts the advantages of no pressure, and runs at much lower temperatures than Applicant's invention (150 to 250 °C versus 300 to 420 °C). (Smuck translation at 5, ll. 14-16; Smuck translation at 9-10, ll. 19-26, 1-6; Smuck translation at 13, l. 8.) Smuck discusses one example of prior art, DE 3,719,976 and notes that the need in the prior art for the use of a plunger results in the disadvantage that pressure is thereby applied to the article to be layered, which makes it impossible for this article to be thin, because it would then be distorted. (Smuck translation at 2, ll. 1-5.) Sandt also does not disclose a film produced by a rapid cooling step, instead touting the advantages of slow cooling. Also, Sandt does not disclose a process for cooling "virgin" PTFE films, instead focusing on modified PTFE.

Further, Sumitomo, Smuck, and Sandt are not combinable in the manner proposed. In particular, there is simply no teaching or suggestion contained in Sumitomo, Smuck, and Sandt to make the proposed combination of references. Because Sumitomo, Smuck, and Sandt do not suggest the proposed combination, the Examiner is relying solely upon Appellant's disclosure for the suggestion of making the proposed combination. Further, there is no expectation of success, and Examiner has cited none. Finally, because of the different films disclosed in the references, utilizing Applicant's rapid cooling method would cause unstable films. The Examiner has failed to state a motivation generally available to one skilled in the art for requiring the Sumitomo method to be run to allow for the thicker PTFE-foils. Sumitomo fails to articulate such a motivation and Sandt and Smuck do not remedy this defect. Thus, Sumitomo, Sandt, and Smuck

cannot serve as a proper basis for a rejection under 35 U.S.C. § 103(a), and claims 1-10 and 14 are patentable.

E. CLAIMS 11-13

Claims 11-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Smuck. Claim 11 is an independent claim. Appellant respectfully submits that this claim is patentable over Smuck as applied to claim 11. Claims 12-13 depend on this claim, and are also patentable.

1. Cooling Time

Smuck does not disclose an apparatus that is capable of obtaining the cooling step used in Applicant's invention. Claim 11 has a limitation that the cooling is "under pressure from about 300 to 420 °C to about 50 °C in about 0.1 to about 240 seconds". Smuck fails to disclose or suggest an apparatus in which the cooling takes place in this short time. Further, Smuck does not teach an apparatus that laminates the woven material with the PTFE foil or the ePTFE foil at approximately 380 to 400 °C under a pressure of 0.1 to 20 N/mm² as is recited in claim 11. Nowhere in Smuck is it disclosed that the apparatus laminates or can laminate at these temperatures. Smuck only discloses that the lamination occurs at a temperature between 150 and 250 °C, temperatures much lower than those in claim 11. Smuck does not disclose an apparatus with all of the elements recited in Applicant's invention, and does not anticipate Applicant's invention.

Smuck does not disclose an apparatus that is capable of the rapid cooling of the composite material disclosed in claim 11. The apparatus in Smuck transfers the pressure from the rollers through the endless band and onto the laminate. This results in a loss of cooling, and heating, respectively as well as a decrease in the rate of cooling (and heating). Consequently, the

apparatus disclosed in Smuck is not and could not be used for rapid cooling. In fact, the apparatus in Smuck actually contains a number of inherent features that make it useful for slow cooling. The apparatus of Smuck is not suitable for lamination of PTFE because the heating temperature obtainable by the rollers in Smuck are insufficient for laminating and sintering PTFE materials. Specifically, the temperatures utilized by the apparatus in Smuck range from 150 to 250 °C. (page 13, ll. 3-8.) The apparatus disclosed in claim 11 functions at temperatures of from 300 to 420 °C. Thus, the apparatus disclosed by Smuck does not have all of the limitations of claim 11, and there is no suggestion to modify the teaching of Smuck to create Applicant's invention, thus Smuck cannot be modified to result in the Applicant's invention.

Smuck does recite that supplementary radiation-heating units can be installed between the heating and cooling rollers, but does not suggest that such supplementary units could result in a doubling of the laminating temperature. Smuck does not disclose that temperatures that are twice as high would have any advantage. Therefore, Smuck does not make the Applicant's invention obvious.

2. Pressure

Although Smuck discusses an apparatus with cooling rollers and pressing forces from 100 to 400 kg per cylinder, it does not utilize pressures as high as that of the Applicant's invention and does not suggest that high pressures would result in an advantage. In fact, Smuck teaches against the use of high pressures. Smuck discusses one example of prior art, DE 3,719,976 and notes that the need in the prior art for the use of a plunger results in the disadvantage that pressure is thereby applied to the article to be layered, which makes it impossible for this article to be thin, because it would then be distorted. (Smuck translation at 2, ll. 1-5.) This disadvantage is described in more detail where Smuck states that the application of

pressure toward the layer of material to be processed, results in the disadvantage that the material is deformed by thermoplastic distortion, for example, gives way in width and in length or even without coordination, which leads to impairment of dimensional accuracy (repeatability). (Smuck translation at 5, ll. 17-27.) The application of pressure is discussed again later, where it is stated that such application of pressure is avoided in the invention. (Smuck translation at 6, ll. 6-10.) Thus, not only does Smuck not disclose an apparatus operating at high pressure, it actually teaches against using high pressure.

Further, there is no motivation to modify the Smuck apparatus to obtain high pressures. Smuck states, with regard to Figure 4, that "important is the fact that no pressing force is exerted upon the laminate 36 by the heating and cooling zones." (Smuck translation at 14, ll. 20-22.) Therefore, one of skill in the art would not have been motivated to modify the apparatus in Smuck to use the high pressures that Applicant utilizes because Smuck teaches against such pressures. Smuck does not teach or suggest the Applicant's invention.

Smuck neither discloses nor suggests fixation with a means that is in cooperation with a controllable cooling means like that disclosed in claim 11. The Applicant's apparatus utilizes a fixation means to regulate or control the shrinkage of the finished product. Based on the disclosure of the Smuck apparatus (which uses lower temperatures and pressures than Applicant's apparatus), one of skill in the art would have no reason to modify it to include a means for fixation. The Examiner has not stated a motivation generally available to one skilled in the art to modify the Smuck apparatus to add such a step. There is nothing in Smuck indicating a motivation to modify, and the Examiner has not indicated any such motivation. For these reasons, the claims are not obvious in view of the Smuck apparatus. Therefore, in addition

to the reasons presented above involving cooling time, temperature, and film thickness, claims 11-13 are patentable.

IX. SUMMARY

Appellant's claims 1-10 and 14 are patentable over Sumitomo, Sandt, and Smuck, and claims 11-13 are patentable over Smuck. It is earnestly requested that the Examiner's rejections be reversed, and that all of the pending claims be allowed.

Please charge any additional fees or credit overpayment to Merchant & Gould Deposit Account No. 13-2725.

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

Date: _____

April 19, 2004



John J. Gresens
Reg. No. 33,112
JJG:RCH

APPENDIX 1

THE CLAIMS ON APPEAL (as finally amended)

1. A method of manufacture of a composite product comprising at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil comprising the steps of:

laminating said at least one layer of foil together with said at least one layer of woven material by heat and pressure, to form a laminated foil and woven material having a partial length and a preceding partial length, wherein said laminating is carried out at approximately 380° C to 400° C under a pressure of 0.1 to 20 N/mm²; and

cooling said laminated foil and woven material in a fully or partly fixed state, wherein said laminated foil and woven material is cooled under pressure, from about 300 to 420 ° C to about 50 ° C in about 0.1 to 240 seconds,

wherein said laminating and cooling is conducted continuously whereby cooling of said partial length of said laminated foil and woven material is carried out simultaneously with the heating of said preceding partial length of said laminated foil and woven material.

2. A method according to claim 1, wherein said laminated foil and woven material is cooled from about 380 to 400 °C to about 50 °C in about 20 to 120 seconds.

3. A method according to claim 1, wherein the laminated foil and woven material is subject to a tension during cooling.

4. A method according to claim 1, further comprising applying pressure to the laminated foil and woven material by means for pressure application.

5. A method according to claim 4, wherein the means for pressure application is provided with cooling means.

6. A method according to claim 4, wherein the pressure is applied continuously by at least one roller.

7. A method according to claim 4, wherein the pressure is applied intermittently by a pressure surface.

8. A method according to claim 1, wherein the laminated foil and woven material is cooled by a substantially uniform pressure on the surface.

9. A composite product comprising at least one layer of reinforcing woven material and at least one layer of PTFE or ePTFE foil, wherein said at least one foil is laminated together with said at least one layer of woven material by heat and pressure, wherein the composite material is subsequently cooled in a fully or partly fixed state, and wherein said composite material is cooled from about 300 to 420 ° C to about 50 ° C in about 0.1 to 240 seconds.

10. A composite product according to claim 9, wherein the reinforcing woven material comprises glass fiber fabric or PTFE coated glass fiber fabric.

11. An apparatus for manufacture of a composite material comprising at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil, where said at least one layer of foil is laminated together with said at least one layer of woven material by heat and pressure, said apparatus comprising:

means for laminating said at least one layer of reinforcing woven material and said at least one layer of foil together, wherein said at least one layer of foil is laminated together with said at least one layer of woven material at approximately 380° C to 400° C under a pressure of 0.1 to 20 N/mm², wherein said means for laminating said at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil comprises a combined pressure and heat supply;

means for fixation of the uncooled or partly cooled laminated at least one layer of reinforcing woven material and at least one layer of PTFE foil or ePTFE foil; and

a controllable cooling means,

wherein said fixation means cooperates with said controllable cooling means, wherein said apparatus is suitable for cooling said composite material under pressure from about 300 to 420° C to about 50° C in about 0.1 to about 240 seconds.

12. An apparatus according to claim 11, wherein the means for fixation and the associated controllable cooling means comprise at least one pressure surface having integrated cooling means.

13. An apparatus according to claim 11, wherein the means for fixation and the associated controllable cooling means comprise at least one roller having integrated cooling means.

14. The method of claim 1, wherein said cooling is carried out at a pressure of from 0.1 to 20 N/mm².

APPENDIX 2

CASES CITED IN THE BRIEF

- A. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988).
- B. In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991).
- C. In re Fritch, 972 F.2d 1260 (Fed. Cir. 1992).
- D. Bausch & Lomb, Inc. v. Barnes-Hind Hydrocurve, Inc., 796 F.2d 443 (Fed. Cir. 1986).
- E. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530 (Fed. Cir. 1983).
- F. In re Royka, 490 F.2d 981 (C.C.P.A. 1974).
- G. In re Gordon, 733 F.2d 900 (Fed. Cir. 1984).
- H. In re Ratti, 270 F.2d 810 (C.C.P.A. 1959).

were not material to Connell's contractual obligation to deliver milled rice by a date certain. The board assessed liquidated damages from the delivery date set in the contract, in the amount of \$289,549.30.

Discussion

[1] In order for a motion for summary judgment to be granted all of the facts material to the result must either be free of dispute or, if disputed facts are resolved in favor of the non-movant, the movant must nevertheless be entitled to a judgment as a matter of law. *United States v. Diebold*, 369 U.S. 654, 655, 82 S.Ct. 993, 994, 8 L.Ed.2d 176 (1962); *Balboa Insurance Co. v. United States*, 775 F.2d 1158, 1163 (Fed.Cir.1985).

[2] Connell argues that the government's changed pattern of ordering rice from other purveyors greatly overburdened the southern mills, and that this government-induced situation contributed to Connell's inability to deliver milled rice in a timely way. The affidavits of both Connell's chief executive officer and the executive vice president of the Rice Millers Association "essentially supported", according to the board, Connell's position. The board held: "Overall, we conclude that questions of fact exist as to whether there was an established practice that the Government would administer its export programs so as not to overburden industry milling capabilities, that Appellant reasonably relied on such practice, that the government violated such practice, and that such violation was the proximate cause of Appellant's untimely deliveries." The board held that these facts were not material to Connell's obligations, holding, in essence, that the obligation to make timely delivery was absolute.

The governing regulations provide relief from liquidated damages under certain conditions. *General Terms and Conditions for the Procurement of Agricultural Commodities or Services*, Agricultural Stabilization and Conservation Service, United States Department of Agriculture, July 1981, Revision No. 1 ("USDA-1"). Article 69(b)(7) of USDA-1 states:

(7) Contractor shall not be liable for liquidated damages for delays due to causes which would relieve the contractor from liability for excess costs as provided in paragraph (c) of Article 70.

Article 70(c) provides that the contractor shall not be liable "for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of Contractor". These causes, as defined in article 2(i), include "acts of Government in either its sovereign or contractual capacity", but "the failure to perform must be beyond the control and without the fault or negligence of the party to the contract seeking excuse from liability."

Applying these provisions of USDA-1 to Connell's position on the facts, summary judgment against Connell should not have been granted. For example, on the issue of delay related to events surrounding the ship *Atalanti*: factual questions requiring resolution include not only whether the Agricultural Stabilization and Conservation Service freight forwarder, Ms. Ryan, had authority to make the statement that if the ship was delayed the delivery of rice could be delayed, but also whether Connell acted "without fault or negligence" in relying on that statement. If these factual questions and inferences are resolved in Connell's favor, summary judgment against Connell can not stand. Further, the board remarked that Connell's reliance on Ms. Ryan's advice accounted for at most three days of delay, the Labor Day weekend; but the record shows no mitigation based on these three days.

Although the board stated that "whether the Government was the proximate cause of appellant's untimely delivery may well excuse an appellant's payment of liquidated damages, in whole or in part", the board denied Connell discovery to develop this defense. The board concluded that it was irrelevant whether the government contributed to the delay in delivery caused by unavailable milling time, holding that Connell could have compensated for any governmental action that affected performance of the contract. The board held that Con-

nell "assumed the risk of unavailable milling time", and that Connell's contract obligations were not conditioned thereon.

[3] Both the board, and the government in its brief, offer theories as to how Connell might have managed, at whatever cost, to obtain milled rice for timely delivery. These theories, in view of the USDA regulations, are relevant only to the question of whether Connell's failure to perform was "beyond [its] control and without [its] fault or negligence". If the government created the situation that caused or contributed to Connell's late delivery, it can not be held as a matter of law that Connell was required to exceed reasonable efforts in order to compensate for this unwarranted governmental action.

The government cites *Jennie-O Foods, Inc. v. United States*, 580 F.2d 400, 409-10 (Ct.Cl.1978), which held that "unanticipated economic hardship" did not excuse failure to perform where the contractor had not shown that "the product (healthy turkeys) was unavailable within the boundaries of a reasonable area." There was no issue in *Jennie-O* of governmental contribution to the failure to perform; nor was a theory of strict liability applied. The issues there raised, as here, are fact-dependent, and in *Jennie-O* were fully developed at trial.

[4] Connell must be enabled to develop the facts pertinent to its defense that the government, acting in its sovereign or contractual capacities, contributed to the delay; the extent of that contribution; and whether Connell was at fault or negligent; for these facts are material to the issues of liability, and the extent thereof. The determination must be made as to whether exculpation has been shown under the circumstances. Public policy and the national interest, as well as the principles of contract law, so require. As the Court explained in *United States v. Brooks-Calloway Co.*, 318 U.S. 120, 122, 68 S.Ct. 474, 476, 87 L.Ed. 653 (1943), the purpose of the standard proviso in government contracts that authorizes such relief is:

Thus contractors know they are not to be penalized for unexpected impediments to prompt performance, and, since their

bids can be based on foreseeable and probable, rather than possible hindrances, the Government secures the benefit of lower bids and an enlarged selection of bidders.

Although the government argues that Connell "failed to meet its burden" on summary judgment, the denial of discovery related to this defense contributed to this failure.

REVERSED AND REMANDED.



In re David H. FINE

No. 87-1319.

United States Court of Appeals,
Federal Circuit.

Jan. 26, 1988.

The Board of Patent Appeals and Interferences of the United States Patent and Trademark Office affirmed rejection of claims of application for patent for system for detecting and measuring minute quantities of nitrogen compounds, and applicant appealed. The Court of Appeals, Mayer, Circuit Judge, held that: (1) it would not have been obvious to substitute nitric oxide detector for sulfur dioxide detector in prior system, and (2) sulfur detection system did not teach use of claimed temperature range.

Reversed.

Edward S. Smith, Circuit Judge, dissenting and filed opinion.

1. Patents ¶16.33

System for detecting and measuring minute quantities of nitrogen compounds was not obvious in light of prior art for separating, identifying, and monitoring sulfur compounds or method for measuring chemiluminescence of reaction between ni-

tric oxide and ozone which required continuous flowing of gaseous mixture into reaction chamber, method for measuring sulfur deliberately sought to avoid nitrogen compounds, and claimed invention retained each nitrogen compound constituent of gaseous sample in chromatograph for individual time period. 35 U.S.C.A. § 103.

2. Patents ϕ 114.19, 114.21

Patent and Trademark Office has burden to establish prima facie case of obviousness, which it may satisfy only by showing some objective teaching in prior art, or that knowledge generally available to one of ordinary skill and art would lead that individual to combined relevant teachings of references. 35 U.S.C.A. § 103.

3. Patents ϕ 26(1)

Whether particular combination might be "obvious to try" is not legitimate test of patentability. 35 U.S.C.A. § 103.

4. Patents ϕ 16.5

Patent which described preferred temperature range for separating, identifying and quantitatively monitoring sulfur compounds could be distinguished from claimed method for detecting and measuring minute quantities of nitrogen compounds which limited temperature to prevent nitrogen from other sources, where purpose of temperature limitation in prior art was to avoid formation of unwanted sulfides.

Morris Relson, Darby & Darby, P.C., New York City, for appellant. With him on the brief was Beverly B. Goodwin.

Lee E. Barrett, Associate Sol., Office of the Solicitor, Arlington, Va., for appellee. With him on the brief were Joseph F. Nakamura, Sol. and Fred E. McKelvey, Deputy Sol.

Before FRIEDMAN, SMITH and MAYER, Circuit Judges.

OPINION

MAYER, Circuit Judge.

David H. Fine appeals from a decision of the Board of Patent Appeals and Interfer-

ences of the United States Patent and Trademark Office (Board) affirming the rejection of certain claims of his application, Serial No. 512,374, and concluding that his invention would have been obvious to one of ordinary skill in the art and was therefore unpatentable under 35 U.S.C. § 103. We reverse.

BACKGROUND

A. The Invention.

The invention claimed is a system for detecting and measuring minute quantities of nitrogen compounds. According to Fine, the system has the ability to detect the presence of nitrogen compounds in quantities as minute as one part in one billion, and is an effective means to detect drugs and explosives, which emanate nitrogen compound vapors even when they are concealed in luggage and closed containers.

The claimed invention has three major components: (1) a gas chromatograph which separates a gaseous sample into its constituent parts; (2) a converter which converts the nitrogen compound effluent output of the chromatograph into nitric oxide in a hot, oxygen-rich environment; and (3) a detector for measuring the level of nitric oxide. The claimed invention's sensitivity is achieved by combining nitric oxide with ozone to produce nitrogen dioxide which concurrently causes a detectable luminescence. The luminescence, which is measured by a visual detector, shows the level of nitric oxide which in turn is a measure of nitrogen compounds found in the sample.

The appealed claims were rejected by the Patent and Trademark Office (PTO) under 35 U.S.C. § 103. Claims 60, 63, 77 and 80 were rejected as unpatentable over Eads, Patent No. 3,650,696 (Eads) in view of Warnick, et al., Patent No. 3,746,513 (Warnick). Claims 62, 68, 69, 79, 85 and 86 were rejected as unpatentable over Eads and Warnick in view of Glass, et al., Patent No. 3,207,585 (Glass).

B. The Prior Art.

1. Eads Patent.

Eads discloses a method for separating, identifying and quantitatively monitoring

Cite as 837 F.2d 1071 (Fed. Cir. 1988)

sulfur compounds. The Eads system is used primarily in "air pollution control work in the scientific characterization of odors from sulfur compounds."

The problem addressed by Eads is the tendency of sulfur compounds "to adhere to or react with the surface materials of the sampling and analytical equipment, and/or react with the liquid or gaseous materials in the equipment." Because of this, the accuracy of measurement is impaired. To solve the problem, the Eads system collects an air sample containing sulfur compounds in a sulfur-free methanol solution. The liquid is inserted into a gas chromatograph which separates the various sulfur compounds. The compounds are next sent through a pyrolysis furnace where they are oxidized to form sulfur dioxide. Finally, the sulfur dioxide passes through a measuring device called a micro-coulometer which uses titration cells to calculate the concentration of sulfur compounds in the sample.

2. Warnick Patent.

Warnick is directed to a means for detecting the quantity of pollutants in the atmosphere. By measuring the chemiluminescence of the reaction between nitric oxide and ozone, the Warnick device can detect the concentration of nitric oxide in a sample gaseous mixture.

Warnick calls for "continuously flowing" a sample gaseous mixture and a reactant containing ozone into a reaction chamber. The chemiluminescence from the resulting reaction is transmitted through a light-transmitting element to produce continuous readouts of the total amount of nitric oxide present in the sample.

3. Glass Patent.

The invention disclosed in Glass is a device for "completely burning a measured amount of a substance and analyzing the combustion products." A fixed amount of a liquid petroleum sample and oxygen are supplied to a flame. The flame is then spark-ignited, causing the sample to burn. The resulting combustion products are then collected and measured, and from this mea-

suredment the hydrogen concentration in the sample is computed.

C. The Rejection.

The Examiner rejected claims 60, 63, 77 and 80 because "substitution of the [nitric oxide] detector of Warnick for the sulfur detector of Eads would be an obvious consideration if interested in nitrogen compounds, and would yield the claimed invention." He further asserted that "Eads teaches the [claimed] combination of chromatograph, combustion, and detection, in that order.... Substitution of detectors to measure any component of interest is well within the skill of the art." In rejecting claims 62, 68, 69, 79, 85 and 86, the Examiner said, "Glass et al. teach a flame conversion means followed by a detector, and substitution of the flame conversion means of Glass et al. for the furnace of Eads would be an obvious equivalent and would yield the claimed invention." The Board affirmed the Examiner's rejection.

DISCUSSION

A. Standard of Review.

Obviousness under 35 U.S.C. § 103 is "a legal conclusion based on factual evidence." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983) (quoting *Stevenson v. Int'l Trade Comm'n*, 612 F.2d 546, 549, 204 USPQ 276, 279 (CCPA 1979)). Therefore, an obviousness determination is not reviewed under the clearly erroneous standard applicable to fact findings, *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed.Cir.1983); it is "reviewed for correctness or error as a matter of law." *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed.Cir.1984).

To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of all the evidence, the decisionmaker must then determine whether ... the claimed invention as a whole would have been

obvious at that time to that person. 35 U.S.C. § 103. The answer to that question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts.

Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1566, 1 USPQ2d 1593, 1595-96 (Fed.Cir.1987).

B. Prima Facie Obviousness.

Fine says the PTO has not established a *prima facie* case of obviousness. He contends the references applied by the Board and Examiner were improperly combined, using hindsight reconstruction, without evidence to support the combination and in the face of contrary teachings in the prior art. He argues that the appealed claims were rejected because the PTO thought it would have been "obvious to try" the claimed invention, an unacceptable basis for rejection.

[1, 2] We agree. The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. See *In re Piacsek*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed.Cir.1984). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Lala*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed.Cir.1984); see also *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n. 24, 227 USPQ 657, 667 n. 24 (Fed.Cir.1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 782 F.2d 1572, 1577, 221 USPQ 929, 938 (Fed.Cir.1984). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention.

The primary basis for the Board's affirmation of the Examiner's rejection was that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. The Board reiterated the Examiner's bald assertion that "substitution of one type of detector for another in the system of Eads

would have been within the skill of the art," but neither of them offered any support for or explanation of this conclusion. Eads is limited to the analysis of sulfur compounds. The particular problem addressed there is the difficulty of obtaining precise measurements of sulfur compounds because of the tendency of sulfur dioxide to adhere to or react with the sampling analytic equipment or the liquid or gaseous materials in the equipment. It solves this problem by suggesting that the gaseous sample containing sulfur compounds be absorbed into sulfur-free methanol and then inserted into a gas chromatograph to separate the sulfur compounds.

There is no suggestion in Eads, which focuses on the unique difficulties inherent in the measurement of sulfur, to use that arrangement to detect nitrogen compounds. In fact, Eads says that the presence of nitrogen is undesirable because the concentration of the titration cell components in the sulfur detector is adversely affected by substantial amounts of nitrogen compounds in the sample. So, instead of suggesting that the system be used to detect nitrogen compounds, Eads deliberately seeks to avoid them; it warns against rather than teaches Fine's invention. See *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed.Cir.1983) (error to find obviousness where references "diverge from and teach away from the invention at hand"). In the face of this, one skilled in the art would not be expected to combine a nitrogen-related detector with the Eads system. Accordingly, there is no suggestion to combine Eads and Warnick.

Likewise, the teachings of Warnick are inconsistent with the claimed invention, to some extent. The Warnick claims are directed to a gas stream from engine exhaust "continuously flowing the gaseous mixtures into the reaction chamber" to obtain "continuous readouts" of the amount of nitric oxide in the sample. In other words, it contemplates measuring the total amount of nitric oxide in a continuously flowing gaseous mixture of unseparated nitrogen constituents. By contrast, in Fine each

nitrogen compound constituent of the gaseous sample is retained in the chromatograph for an individual time period so that each exits in discrete, time-separated pulses. By this process, each constituent may be both identified by its position in time sequence, and measured. The claimed system, therefore, diverges from Warnick and teaches advantages not appreciated or contemplated by it.

[3] Because neither Warnick nor Eads, alone or in combination, suggests the claimed invention, the Board erred in affirming the Examiner's conclusion that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. *ACS Hosp. Sys.*, 732 F.2d at 1575-77, 221 USPQ at 931-33. The Eads and Warnick references disclose, at most, that one skilled in the art might find it obvious to try the claimed invention. But whether a particular combination might be "obvious to try" is not a legitimate test of patentability. *In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed.Cir.1987); *In re Goodwin*, 576 F.2d 375, 377, 198 USPQ 1, 3 (CCPA 1978).

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 938. And "teachings of references can be combined only if there is some suggestion or incentive to do so." *Id.* Here, the prior art contains none.

Instead, the Examiner relies on hindsight in reaching his obviousness determination. But this court has said, "To imbue one of ordinary skill in the art with knowledge of

* The Solicitor argues that the contents of Attachment C of Fine's brief were not before the Board and may not properly be considered here. However, we need not rely on Attachment C. It is merely illustrative of the qualitative separation of nitrogen compounds which occurs in Fine's system. The fact that the vari-

the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore*, 721 F.2d at 1553, 220 USPQ at 312-13. It is essential that "the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made . . . to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *Id.* One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

C. Advantage Not Appreciated by the Prior Art.

[4] The Board erred not only in improperly combining the Eads and Warnick references but also in failing to appreciate that the appealed claims can be distinguished over that combination. A material limitation of the claimed system is that the conversion to nitric oxide occur in the range of 600°C to 1700°C. The purpose of this limitation is to prevent nitrogen from other sources, such as the air, from being converted to nitric oxide and thereby distorting the measurement of nitric oxide derived from the nitrogen compounds of the sample.

The claimed nitric oxide conversion temperature is not disclosed in Warnick. Although Eads describes a preferred temperature of 675°C to 725°C, the purpose of this range is different from that of Fine. Eads requires the 675°C to 725°C range because it affords a temperature low enough to avoid formation of unwanted sulfur trioxide, yet high enough to avoid formation of unwanted sulfides. Fine's temperature

constituents exit at discrete intervals is shown by the specification which was before the Board and which may appropriately be considered on appeal. See, e.g., *Astra-Sjuco, A.B. v. United States Int'l Trade Comm'n*, 629 F.2d 682, 686, 207 USPQ 1, 5 (CCPA 1980) (claims must be construed in light of specification).

range, in contrast, does not seek to avoid the formation of sulfur compounds or even nitrogen compounds. It enables the system to break down the nitrogen compounds of the sample while avoiding the destruction of background nitrogen gas. There is a partial overlap, of course, but this is mere happenstance. Because the purposes of the two temperature ranges are entirely unrelated, Eads does not teach use of the claimed range. See *In re Geiger*, 815 F.2d at 688, 2 USPQ2d at 1278. The Board erred by concluding otherwise.

D. Unexpected Results.

Because we reverse for failure to establish a *prima facie* case of obviousness, we need not reach Fine's contention that the Board failed to accord proper weight to the objective evidence of unexpected superior results. *Id.*

E. The "Flame" Claims.

Claims 62, 68, 69, 79, 85 and 86 relate to the oxygen-rich flame conversion means of the claimed invention. These "flame" claims depend from either apparatus claim 60 or method claim 77. Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious. *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed.Cir.1987); *In re Abela*, 684 F.2d 902, 910, 214 USPQ 682, 689 (CCPA 1982); see also *In re Serenaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed.Cir.1983). In view of our conclusion that claims 60 and 77 are nonobvious, the dependent "flame" claims are also patentable.

CONCLUSION

The Board's decision affirming the Examiner's rejection of claims 60, 62, 63, 68, 69, 77, 79, 80, 85 and 86 of Fine's application as unpatentable over the prior art under 35 U.S.C. § 103 is

REVERSED.

EDWARD S. SMITH, Circuit Judge, dissenting.

I respectfully dissent. I am of the firm belief that the prior art references, relied upon by the PTO to establish its *prima facie* case of obviousness, in combination teach and suggest Fine's invention to one skilled in the art. Also, I firmly believe that Fine failed to rebut the PTO's *prima facie* case. On this basis, I would affirm the board's determination sustaining the examiner's rejection, pursuant to 35 U.S.C. § 103, of Fine's claims on appeal before this court.



PETROCHEM SERVICES, INC., Appellant,

v.

The UNITED STATES, Appellee. No. 87-1382.

United States Court of Appeals,
Federal Circuit.

Decided Jan. 26, 1988.

Government contractor appealed decision of the Armed Services Board of Contract Appeals denying contractor's claim for equitable adjustment of contract to remove oil spilled on naval base. The Court held that Government's duty to disclose superior knowledge was not legally discharged by Navy supervisor's oral representations, unless contractor's representative heard and understood representations.

Vacated and remanded.

1. United States ¶70(30)

Disclosure of superior knowledge doctrine applies in situations where contractor undertakes to perform without vital knowledge of fact that affects performance costs

PETROCHEM SERVICES, INC. v. U.S.

Cite as 837 F.2d 1076 (Fed. Cir. 1988)

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or duration, Government was aware contractor had no knowledge of and had no reason to obtain such information, any contract specifications supplied misled contractor, or did not put it on notice to inquire, and Government failed to provide relevant information.

2. United States ¶70(30)

Once Government advised contractor's representative that 21,000 gallons of oil had spilled, and number of gallons estimated by representative varied tremendously from Government's assessment, burden shifted to contractor to inquire further in order to verify crucial contract specification.

3. United States ¶70(30)

There is no express or implied rule that Government must provide its contractors information in writing in order to discharge its duty to disclose superior knowledge.

4. United States ¶70(30)

If Government is not held liable for failing to warn contractors of specific conditions noticeable in site inspection, then Government should not be held liable for making effort to disclose superior knowledge, albeit, not in best fashion.

5. United States ¶70(30)

Where oral communications were made to contractor, Government may not satisfy its duty to disclose superior knowledge unless it shows that communication was not only made, but also heard, and understood, actually or apparently; Government may satisfy its burden by showing, either through conversations held between contractor and government agent or other such evidence, that it reasonably believed contractor was aware of communication and understood its import.

6. United States ¶70(30)

Government's duty to disclose superior knowledge was not legally discharged by Navy supervisor's oral representations to government contractor's representative, at time of on-site inspection, that 21,000 gallons of oil had spilled, unless representative heard and understood representation.

837 F.2d—45

Ronald Van Stockum, Jr., Louisville, Ky., submitted for appellant.

Jeanne A. Anderson, Commercial Litigation Branch, Dept. of Justice, Washington, D.C., submitted for appellee. With her on the brief were Richard K. Willard, Asst. Atty. Gen., David M. Cohen, Director and Thomas W. Petersen, Asst. Director. Also on the brief was Ken Hornick, Asst. Counsel, Dept. of the Navy, of counsel.

Before ARCHER, Circuit Judge, NICHOLS, Senior Circuit Judge, and MAYER, Circuit Judge.

NICHOLS, Senior Circuit Judge.

Petrochem Services, Inc. appeals the decision of the Armed Services Board of Contract Appeals [ASBCA or board], ASBCA No. 33105, 87-1 BCA (CCH) ¶19,597 (1987), holding that the government discharged its duty to disclose superior knowledge through oral representations made to appellant at the time of on-site inspection. We vacate the ASBCA's judgment denying Petrochem's appeal and remand.

Issues

The issues raised by the parties are twofold. First, was the government's duty to disclose superior knowledge legally discharged by the government's oral representations to Petrochem? Second, was the ASBCA's decision arbitrary, capricious, so grossly erroneous as to imply bad faith, or not supported by substantial evidence so as to require reversal and remand?

Background

On January 29, 1982, oil spilled from a storage tank being filled at the Great Lakes, Illinois Naval Base. The tank:

is a part of the facility's steam generation capability and provides back-up fuel The tank is constructed of steel and is approximately 60 to 70 feet in diameter, 40 feet high and contains perhaps as much as a half million gallons of fuel oil. The tank sits in the middle of a rectangular containment area approximately 80 x 100 feet in size. The floor

ant as well as the public interest, the Commission abuses its discretion by declining to release the bond merely because of sales by a respondent of goods known to the complainant at the time of the agreement.

Biocraft also makes other arguments which we need not address.

CONCLUSION

The Commission's denials of Biocraft's requests for return or cancellation of bonds posted pursuant to the Temporary Cease and Desist Order issued January 10, 1990, were an abuse of discretion. Its order is therefore

REVERSED.



In re Mark A. VAECK, Wipa
Chungiatupornchai and
Lee McIntosh.

No. 91-1120.

United States Court of Appeals,
Federal Circuit.

Oct. 21, 1991.

Inventor sought patent for claimed invention directed to use of genetic engineering techniques for production of insecticidal proteins. The United States Patent and Trademark Office Board of Patent Appeals and Interferences affirmed an examiner's rejection of certain claims, and appeal was taken. The Court of Appeals, Rich, Circuit Judge, held that: (1) patent application was improperly rejected on ground of prima facie obviousness, and (2) patent application was properly rejected to extent that claims were too general to enable person skilled in art to make and use claimed invention without undue experimentation.

Affirmed in part, reversed in part.

Mayer, Circuit Judge, dissented and filed opinion.

1. Patents \S 314(5)

Obviousness of invention for which patent is sought is legal question which court independently reviews, though based upon Patent and Trademark Office's underlying factual findings, which court reviews under clearly erroneous standard. 35 U.S.C.A. \S 103.

2. Patents \S 16(2)

In reviewing rejection of invention for patent as obvious in view of combination of prior art references, court considers whether prior art would have suggested to those of ordinary skill in art that they should make claimed composition or device, or carry out claimed process, and whether prior art would also have revealed that in so making or carrying out, those of ordinary skill would have reasonable expectation of success; both suggestion and reasonable expectation of success must be found in prior art, not in applicant's disclosure. 35 U.S.C.A. \S 103.

3. Patents \S 16:25

Patent application for genetic engineering techniques for production of insecticidal proteins was improperly rejected on ground of prima facie obviousness; prior art did not disclose or suggest expression in cyanobacteria of chimeric gene encoding insecticidally active protein, or convey to those of ordinary skill reasonable expectation of success in doing so. 35 U.S.C.A. \S 103.

4. Patents \S 99

To be patentable, specification of patent must enable any person skilled in art to which it pertains to make and use claimed invention without undue experimentation. 35 U.S.C.A. \S 112.

5. Patents \S 99

Patent application for using genetic engineering techniques to produce insecticidal proteins was properly rejected to extent that claims were too general to enable person skilled in art to make and use claimed invention without undue experimentation;

claim referred to use of cyanobacteria in general as host organism, despite fact that cyanobacteria were diverse and relatively poorly studied group of organisms, comprising some 150 different genera, with successful use of any one type in manner called for in invention being unpredictable. 35 U.S.C.A. \S 112.

6. Patents \S 99

Although patent applicants are not required to disclose every species encompassed by their claims, even in unpredictable art, in order to satisfy enablement requirement for patentability, there must be sufficient disclosure, either through illustrative examples or terminology, to teach those of ordinary skill how to make and how to use invention as broadly as it is claimed. 35 U.S.C.A. \S 112.

Ian C. McLeod, Ian C. McLeod, P.C., Okemos, Mich., argued for appellant.

Teddy S. Gron, Associate Sol., Office of the Sol., of Arlington, Va., argued for appellee. With him on the brief were Fred E. McKelvey, Sol. and Richard E. Schafer, Associate Sol.

Before RICH, ARCHER, and MAYER, Circuit Judges.

RICH, Circuit Judge.

This appeal is from the September 12, 1990 decision of the Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), affirming the examiner's rejection of claims 1-48 and 50-52 of application Serial No. 07/021,405, filed March 4, 1987, titled "Hybrid Genes Incorporating a DNA Fragment Containing a Gene Coding for an Insecticidal Protein, Plasmids, Transformed Cyanobacteria Expressing Such Protein and Method for Use as a Biocontrol Agent" as unpatentable under 35 U.S.C. \S 103, as well as the rejection of claims 49-53.

1. Basic vocabulary and techniques for gene cloning and expression have been described in *In re O'Farrell*, 853 F.2d 894, 895-99, 7 USPQ2d 1673, 1674-77 (Fed.Cir.1988), and are not repeated here.

2. All living cells can be classified into one of two broad groups, prokaryotes and eukaryotes.

BACKGROUND

A. The Invention

The claimed invention is directed to the use of genetic engineering techniques¹ for production of proteins that are toxic to insects such as larvae of mosquitoes and black flies. These swamp-dwelling pests are the source of numerous human health problems, including malaria. It is known that certain species of the naturally-occurring *Bacillus* genus of bacteria produce proteins ("endotoxins") that are toxic to these insects. Prior art methods of combating the insects involved spreading or spraying crystalline spores of the insecticidal *Bacillus* proteins over swamps. The spores were environmentally unstable, however, and would often sink to the bottom of a swamp before being consumed, thus rendering this method prohibitively expensive. Hence the need for a lower-cost method of producing the insecticidal *Bacillus* proteins in high volume, with application in a more stable vehicle.

As described by appellants, the claimed subject matter meets this need by providing for the production of the insecticidal *Bacillus* proteins within host cyanobacteria. Although both cyanobacteria and bacteria are members of the prokaryote² kingdom, the cyanobacteria (which in the past have been referred to as "blue-green algae") are unique among prokaryotes in that the cyanobacteria are capable of oxygenic photosynthesis. The cyanobacteria grow on top of swamps where they are consumed by mosquitoes and black flies. Thus, when *Bacillus* proteins are produced with-

The prokaryotes comprise organisms formed of cells that do not have a distinct nucleus; their DNA floats throughout the cellular cytoplasm. In contrast, the cells of eucaryotic organisms such as man, other animals, plants, protozoa, algae and yeast have a distinct nucleus wherein their DNA resides.

in transformed³ cyanobacterial hosts according to the claimed invention, the presence of the insecticide in the food of the targeted insects advantageously guarantees direct uptake by the insects.

More particularly, the subject matter of the application on appeal includes a chimeric (i.e., hybrid) gene comprising (1) a gene derived from a bacterium of the *Bacillus* genus whose product is an insecticidal protein, united with (2) a DNA promoter effective for expressing⁴ the *Bacillus* gene in a host cyanobacterium, so as to produce the desired insecticidal protein.

The claims on appeal are 1-48 and 50-52, all claims remaining in the application. Claim 1 reads:

1. A chimeric gene capable of being expressed in Cyanobacteria cells comprising:

(a) a DNA fragment comprising a promoter region which is effective for expression of a DNA fragment in a Cyanobacterium; and

(b) at least one DNA fragment coding for an insecticidally active protein produced by a *Bacillus* strain, or coding for an insecticidally active truncated form of the above protein or coding for a protein having substantial sequence homology to the active protein,

the DNA fragments being linked so that the gene is expressed.

Claims 2-15, which depend from claim 1, recite preferred *Bacillus* species, promoters, and selectable markers.⁵ Independent claim 16 and claims 17-31 which depend therefrom are directed to a hybrid plasmid vector which includes the chimeric gene of claim 1. Claim 32 recites a bacterial strain. Independent claim 33 and claims 34-48 which depend therefrom recite a cyanobac-

3. "Transformed" cyanobacteria are those that have successfully taken up the foreign *Bacillus* DNA such that the DNA information has become a permanent part of the host cyanobacteria, to be replicated as new cyanobacteria are generated.

4. "Expression" of a gene refers to the production of the protein which the gene encodes; more specifically, it is the process of transferring information from a gene (which consists of

terium which expresses the chimeric gene of claim 1. Claims 50-51 recite an insecticidal composition. Claim 52 recites a particular plasmid that appellants have deposited.

B. Appellants' Disclosure

In addition to describing the claimed invention in generic terms, appellants' specification discloses two particular species of *Bacillus* (*B. thuringiensis*, *B. sphaericus*) as sources of insecticidal protein; and nine genera of cyanobacteria (*Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*, *Aphanocapsa*, *Gloeocapsa*, *Nostoc*, *Anabaena* and *Fremyella*) as useful hosts.

The working examples relevant to the claims on appeal detail the transformation of a single strain of cyanobacteria, i.e., *Synechocystis* 6803. In one example, *Synechocystis* 6803 cells are transformed with a plasmid comprising (1) a gene encoding a particular insecticidal protein ("B.t. 8") from *Bacillus thuringiensis* var. *israelensis*, linked to (2) a particular promoter, the P_L promoter from the bacteriophage Lambda (a virus of *E. coli*). In another example, a different promoter, i.e., the *Synechocystis* 6803 promoter for the rubisco operon, is utilized instead of the Lambda P_L promoter.

C. The Prior Art

A total of eleven prior art references were cited and applied, in various combinations, against the claims on appeal.

The focus of Dzelzkalns,⁶ the primary reference cited against all of the rejected claims, is to determine whether chloroplast promoter sequences can function in cyanobacteria. To that end Dzelzkalns discloses the expression in cyanobacteria of a chimeric gene comprising a chloroplast promot-

DNA) via messenger RNA to ribosomes where a specific protein is made.

5. In the context of the claimed invention, "selectable markers" or "marker genes" refer to antibiotic-resistance conferring DNA fragments, attached to the gene being expressed, which facilitate the selection of successfully transformed cyanobacteria.

6. 12 *Nucleic Acids Res.* 8917 (1984).

er sequence fused to a gene encoding the enzyme chloramphenicol acetyl transferase (CAT).⁷ Importantly, Dzelzkalns teaches the use of the CAT gene as a "marker" gene; this use of antibiotic resistance-conferring genes for selection purposes is a common technique in genetic engineering.

Sekar I,⁸ Sekar II,⁹ and Ganesan¹⁰ collectively disclose expression of genes encoding certain *Bacillus* insecticidal proteins in the bacterial hosts *B. megaterium*, *B. subtilis* and *E. coli*.

Friedberg¹¹ discloses the transformation of the cyanobacterium *Anacystis nidulans* R2 by a plasmid vector comprising the O₂P_L operator-promoter region and a temperature-sensitive repressor gene of the bacteriophage Lambda. While the cyanobacteria are attractive organisms for the cloning of genes involved in photosynthesis, Friedberg states, problems may still be encountered such as suboptimal expression of the cloned gene, detrimental effects on cell growth of overexpressed, highly hydrophobic proteins, and rapid turnover of some gene products. To address these problems, Friedberg teaches the use of the disclosed Lambda regulatory signals in plasmid vehicles which, it states, have "considerable potential for use as vectors the expression of which can be controlled in *Anacystis*...."

Miller¹² compares the initiation specificities *in vitro* of DNA-dependent RNA polymerases¹³ purified from two different species of cyanobacteria (*Fremyella diplosiphon* and *Anacystis nidulans*), as well as from *E. coli*.

7. Chloramphenicol is an antibiotic; CAT is an enzyme which destroys chloramphenicol and thus imparts resistance thereto.

8. 137 *Biochem. and Biophys. Res. Comm.* 748 (1986).

9. 33 *Gene* 151 (1985).

10. 189 *Mol. Gen. Genet.* 181 (1983).

11. 203 *Mol. Gen. Genet.* 505 (1986).

12. 140 *J. Bacteriology* 246 (1979).

13. RNA polymerase, the enzyme responsible for making RNA from DNA, binds at specific nucleotide sequences (promoters) in front of genes

Nierzwicki-Bauer¹⁴ identifies in the cyanobacterium *Anabaena* 7120 the start site for transcription of the gene encoding *rbcL*, the large subunit of the enzyme ribulose-1,5-bisphosphate carboxylase. It reports that the nucleotide sequence 14-8 base pairs preceding the transcription start site "resembles a good *Escherichia coli* promoter," but that the sequence 35 base pairs before the start site does not.

Chauvat¹⁵ discloses host-vector systems for gene cloning in the cyanobacterium *Synechocystis* 6803, in which the antibiotic resistance-conferring *neo* gene is utilized as a selectable marker.

Reiss¹⁶ studies expression in *E. coli* of various proteins formed by fusion of certain foreign DNA sequences with the *neo* gene.

Kolowsky¹⁷ discloses chimeric plasmids designed for transformation of the cyanobacterium *Synechococcus* R2, comprising an antibiotic-resistant gene linked to chromosomal DNA from the *Synechococcus* cyanobacterium.

Barnes, United States Patent No. 4,695,455, is directed to the treatment with stabilizing chemical reagents of pesticides produced by expression of heterologous genes (such as those encoding *Bacillus* proteins) in host microbial cells such as *Pseudomonas* bacteria. The host cells are killed by this treatment, but the resulting pesticidal compositions exhibit prolonged toxic activity when exposed to the environment of target pests.

in DNA, and then moves through the gene making an RNA molecule that includes the information contained in the gene. Initiation specificity is the ability of the RNA polymerase to initiate this process specifically at a site(s) on the DNA template.

14. 81 *Proc. Natl. Acad. Sci. USA* 5961 (1984).

15. 204 *Mol. Gen. Genet.* 185 (1986).

16. 30 *Gene* 211 (1984).

17. 27 *Gene* 289 (1984).

D. *The Grounds of Rejection*

1. The § 103 Rejections

Claims 1-6, 16-21, 33-38, 47-48 and 52 (which include all independent claims in the application) were rejected as unpatentable under 35 U.S.C. § 103 based upon Dzelzkals in view of Sekar I or Sekar II and Ganesan. The examiner stated that Dzelzkals discloses a chimeric gene capable of being highly expressed in a cyanobacterium, said gene comprising a promoter region effective for expression in a cyanobacterium operably linked to a structural gene encoding CAT. The examiner acknowledged that the chimeric gene and transformed host of Dzelzkals differ from the claimed invention in that the former's structural gene encodes CAT rather than insecticidally active protein. However, the examiner pointed out, Sekar I, Sekar II, and Ganesan teach genes encoding insecticidally active proteins produced by *Bacillus*, and the advantages of expressing such genes in heterologous¹⁸ hosts to obtain larger quantities of the protein. The examiner contended that it would have been obvious to one of ordinary skill in the art to substitute the *Bacillus* genes taught by Sekar I, Sekar II, and Ganesan for the CAT gene in the vectors of Dzelzkals in order to obtain high level expression of the *Bacillus* genes in the transformed cyanobacteria. The examiner further contended that it would have been obvious to use cyanobacteria as heterologous hosts for expression of the claimed genes due to the ability of cyanobacteria to serve as transformed hosts for the expression of heterologous genes. In the absence of evidence to the

contrary, the examiner contended, the invention as a whole was prima facie obvious.

Additional rejections were entered against various groups of dependent claims which we need not address here. All additional rejections were made in view of Dzelzkals in combination with Sekar I, Sekar II, and Ganesan, and further in view of other references discussed in Part C above.

The Board affirmed the § 103 rejections, basically adopting the examiner's Answer as its opinion while adding a few comments. The legal conclusion of obviousness does not require absolute certainty, the Board added, but only a reasonable expectation of success, citing *In re O'Farrell*, 853 F.2d 894, 7 U.S.P.Q.2d 1673 (Fed. Cir.1988). In view of the disclosures of the prior art, the Board concluded, one of ordinary skill in the art would have been motivated by a reasonable expectation of success to make the substitution suggested by the examiner.

2. The § 112 Rejection

The examiner also rejected claims 1-48 and 50-51 under 35 U.S.C. § 112, first paragraph, on the ground that the disclosure was enabling only for claims limited in accordance with the specification as filed. Citing *Manual of Patent Examining Procedure* (MPEP) provisions 706.03(n)¹⁹ and (2)²⁰ as support, the examiner took the position that undue experimentation would be required of the art worker to practice the claimed invention, in view of the unpredictability in the art, the breadth of the claims, the limited number of working examples and the limited guidance provided

546. This is because in arts such as chemistry it is not obvious from the disclosure of one species, what other species will work. *In re Dreshfield*, 1940 C.D. 351; 518 O.G. 255 gives this general rule: "It is well settled that in cases involving chemicals and chemical compounds, which differ radically in their properties it must appear in an applicant's specification either by the enumeration of a sufficient number of the members of a group or by other appropriate language, that the chemicals or chemical combinations included in the claims are capable of accomplishing the desired result." . . .

18. Denotes different species or organism.

19. MPEP 706.03(n). "Correspondence of Claim and Disclosure," provides in part:

In chemical cases, a claim may be so broad as to not be supported by [the] disclosure, in which case it is rejected as unwarranted by the disclosure. . . .

20. MPEP 706.03(2). "Undue Breadth," provides in part:

[I]n applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims. *In re Sol*, 1938 C.D. 723; 497 O.G.

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in the specification. With respect to unpredictability, the examiner stated that

[t]he cyanobacteria comprise a large and diverse group of photosynthetic bacteria including large numbers of species in some 150 different genera including *Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*, *Nostoc*, *Anabaena*, etc. The molecular biology of these organisms has only recently become the subject of intensive investigation and this work is limited to a few genera. Therefore the level of unpredictability regarding heterologous gene expression in this large, diverse and relatively poorly studied group of procaryotes is high. . . .

The Board affirmed, noting that "the limited guidance in the specification, considered in light of the relatively high degree of unpredictability in this particular art, would not have enabled one having ordinary skill in the art to practice the broad scope of the claimed invention without undue experimentation. *In re Fisher*, 427 F.2d 833, 166 U.S.P.Q. 18 (CCPA 1970)."

OPINION

A. *Obviousness*

[1] We first address whether the PTO erred in rejecting the claims on appeal as prima facie obvious within the meaning of 35 U.S.C. § 103. Obviousness is a legal question which this court independently reviews, though based upon underlying factual findings which we review under the clearly erroneous standard. *In re Woodruff*, 919 F.2d 1575, 1577, 16 U.S.P.Q.2d 1934, 1935 (Fed.Cir.1990).

[2] Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have

a reasonable expectation of success. See *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed.Cir.1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *Id.*

[3] We agree with appellants that the PTO has not established the prima facie obviousness of the claimed subject matter. The prior art simply does not disclose or suggest the expression in cyanobacteria of a chimeric gene encoding an insecticidally active protein, or convey to those of ordinary skill a reasonable expectation of success in doing so. More particularly, there is no suggestion in Dzelzkals, the primary reference cited against all claims, of substituting in the disclosed plasmid a structural gene encoding *Bacillus* insecticidal proteins for the CAT gene utilized for selection purposes. The expression of antibiotic resistance-conferring genes in cyanobacteria, without more, does not render obvious the expression of unrelated genes in cyanobacteria for unrelated purposes.

The PTO argues that the substitution of insecticidal *Bacillus* genes for CAT marker genes in cyanobacteria is suggested by the secondary references Sekar I, Sekar II, and Ganesan, which collectively disclose expression of genes encoding *Bacillus* insecticidal proteins in two species of host *Bacillus* bacteria (*B. megaterium* and *B. subtilis*) as well as in the bacterium *E. coli*. While these references disclose expression of *Bacillus* genes encoding insecticidal proteins in certain transformed bacterial hosts, nowhere do these references disclose or suggest expression of such genes in transformed cyanobacterial hosts.

To remedy this deficiency, the PTO emphasizes similarity between bacteria and cyanobacteria, namely, that these are both procaryotic organisms, and argues that this fact would suggest to those of ordinary skill the use of cyanobacteria as hosts for expression of the claimed chimeric genes. While it is true that bacteria and cyanobacteria are now both classified as procaryotes, that fact alone is not sufficient to motivate the art worker as the PTO con-

tends. As the PTO concedes, cyanobacteria and bacteria are not identical; they are classified as two separate divisions of the kingdom Prokaryotae.²¹ Moreover, it is only in recent years that the biology of cyanobacteria has been clarified, as evidenced by references in the prior art to "blue-green algae." Such evidence of recent uncertainty regarding the biology of cyanobacteria tends to rebut, rather than support, the PTO's position that one would consider the cyanobacteria effectively interchangeable with bacteria as hosts for expression of the claimed gene.

At oral argument the PTO referred to additional secondary references, not cited against any independent claim (i.e., Friedberg, Miller, and Nierzwicki-Bauer), which it contended disclose certain amino acid sequence homology between bacteria and cyanobacteria. The PTO argued that such homology is a further suggestion to one of ordinary skill to attempt the claimed invention. We disagree. As with the Dzelzkains, Sekar I, Sekar II, and Ganesan references discussed above, none of these additional references disclose or suggest that cyanobacteria could serve as hosts for expression of genes encoding *Bacillus* insecticidal proteins. In fact, these additional references suggest as much about *divergences* between cyanobacteria and bacteria as they do about similarities. For example, Nierzwicki-Bauer reports that a certain nucleotide sequence (i.e., the -10 consensus sequence) in a particular cyanobacterium resembles an *E. coli* promoter, but that another nearby nucleotide sequence (the -35 region) does not. While Miller speaks of certain promoters of the bacteriophage Lambda that are recognized by both cyanobacterial and *E. coli* RNA polymerases, it also discloses that these promoters exhibited differing strengths when exposed to the different polymerases. Differing sensitivities of the respective polymerases to an inhibitor are also disclosed, suggesting differences in the structures of the initiation complexes.

21. *Stedman's Medical Dictionary* 1139 (24th ed. 1982) (definition of "Prokaryotae"). Prokaryotic organisms are commonly classified according to the following taxonomic hierarchy: Kingdom;

The PTO asks us to agree that the prior art would lead those of ordinary skill to conclude that cyanobacteria are attractive hosts for expression of any and all heterologous genes. Again, we can not. The relevant prior art does indicate that cyanobacteria are attractive hosts for expression of both native and heterologous genes *involved in photosynthesis* (not surprisingly, for the capability of undergoing oxygenic photosynthesis is what makes the cyanobacteria unique among prokaryotes). However, these references do not suggest that cyanobacteria would be equally attractive hosts for expression of *unrelated* heterologous genes, such as the claimed genes encoding *Bacillus* insecticidal proteins.

In *O'Farrell*, this court affirmed an obviousness rejection of a claim to a method for producing a "predetermined protein in a stable form" in a transformed bacterial host. 853 F.2d at 895, 7 U.S.P.Q.2d at 1674. The cited references included a prior art publication (the Polisky reference) whose three authors included two of the three coinventor-appellants. The main difference between the prior art and the claim at issue was that in Polisky, the heterologous gene was a gene for ribosomal RNA, while the claimed invention substituted a gene coding for a predetermined protein. *Id.* at 901, 7 U.S.P.Q.2d at 1679. Although, as the appellants therein pointed out, the ribosomal RNA gene is not normally translated into protein, Polisky mentioned preliminary evidence that the transcript of the ribosomal RNA gene was translated into protein, and further predicted that if a gene coding for a protein were to be substituted, extensive translation might result. *Id.* We thus affirmed, explaining that

the prior art explicitly suggested the substitution that is the difference between the claimed invention and the prior art, and presented preliminary evidence suggesting that the [claimed] method could be used to make proteins.

....

Division; Class; Order; Family; Genus; Species. 3 *Bergey's Manual of Systematic Bacteriology* 1601 (1989).

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... Polisky contained detailed enabling methodology for practicing the claimed invention, a suggestion to modify the prior art to practice the claimed invention, and evidence suggesting that it would be successful.

Id. at 901-02, 7 U.S.P.Q.2d at 1679-80.

In contrast with the situation in *O'Farrell*, the prior art in this case offers no suggestion, explicit or implicit, of the substitution that is the difference between the claimed invention and the prior art. Moreover, the "reasonable expectation of success" that was present in *O'Farrell* is not present here. Accordingly, we reverse the § 103 rejections.

B. Enablement

[4] The first paragraph of 35 U.S.C. § 112 requires, *inter alia*, that the specification of a patent enable any person skilled in the art to which it pertains to make and use the claimed invention. Although the statute does not say so, enablement requires that the specification teach those in the art to make and use the invention without "undue experimentation." *In re Wanda*, 858 F.2d 731, 8 U.S.P.Q.2d 1400, 1404 (Fed.Cir.1988). That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is "undue." *Id.* at 736-37, 8 U.S.P.Q.2d at 1404. Enablement, like obviousness, is a question of law which we independently review, although based upon underlying factual findings which we review for clear error. See *id.* at 735, 8 U.S.P.Q.2d at 1402.

[5] In response to the § 112 rejection, appellants assert that their invention is "pioneering," and that this should entitle them to claims of broad scope. Narrower claims would provide no real protection, appellants argue, because the level of skill in this art is so high, art workers could easily avoid the claims. Given the disclosure in their

specification, appellants contend that any skilled microbiologist could construct vectors and transform many different cyanobacteria, using a variety of promoters and *Bacillus* DNA, and could easily determine whether or not the active *Bacillus* protein was successfully expressed by the cyanobacteria.

The PTO made no finding on whether the claimed invention is indeed "pioneering," and we need not address the issue here. With the exception of claims 47 and 48, the claims rejected under § 112 are not limited to any particular genus or species of cyanobacteria. The PTO's position is that the cyanobacteria are a diverse and relatively poorly studied group of organisms, comprising some 150 different genera, and that heterologous gene expression in cyanobacteria is "unpredictable." Appellants have not effectively disputed these assertions. Moreover, we note that only one particular species of cyanobacteria is employed in the working examples of appellants' specification, and only nine genera of cyanobacteria are mentioned in the entire document.

Taking into account the relatively incomplete understanding of the biology of cyanobacteria as of appellants' filing date, as well as the limited disclosure by appellants of particular cyanobacterial genera operative in the claimed invention, we are not persuaded that the PTO erred in rejecting claims 1-46 and 50-51 under § 112, first paragraph. There is no reasonable correlation between the narrow disclosure in appellants' specification and the broad scope of protection sought in the claims encompassing gene expression in any and all cyanobacteria. See *In re Fisher*, 427 F.2d 883, 889, 166 U.S.P.Q. 18, 24 (CCPA 1970) (the first paragraph of § 112 requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification).²² Accordingly,

Research Found., Inc. v. Genentech, Inc., 904 F.2d 1558, 1568-69, 15 U.S.P.Q.2d 1039, 1047-48 (Fed.Cir.1990) (directing district court, on remand, to consider effect of *Hogan* and *United States Steel* on the enablement analysis of *Fisher*) cert. dismissed, — U.S. —, 111 S.Ct. 1434, 113 L.Ed.2d 485 (1991). We therefore do not

22. The enablement rejection in this case was not based upon a post-filing date state of the art, as in *In re Hogan*, 559 F.2d 595, 605-07, 194 U.S.P.Q. 527, 536-38 (CCPA 1977). See also *United States Steel Corp. v. Phillips Petroleum Co.*, 865 F.2d 1247, 1251, 9 U.S.P.Q.2d 1461, 1464 (Fed.Cir.1989) (citing *Hogan*); *Hormone*

we affirm the § 112 rejection as to those claims.

[6] In so doing we do not imply that patent applicants in art areas currently denominated as "unpredictable" must never be allowed generic claims encompassing more than the particular species disclosed in their specification. It is well settled that patent applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art. *In re Angstadt*, 537 F.2d 498, 502-03, 190 U.S.P.Q. 214, 218 (CCPA 1976). However, there must be sufficient disclosure, either through illustrative examples or terminology,²³ to teach those of ordinary skill how to make and how to use the invention as broadly as it is claimed. This means that the disclosure must adequately guide the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility. Where, as here, a claimed genus represents a diverse and relatively poorly understood group of microorganisms, the required level of disclosure will be greater than, for example, the disclosure of an invention involving a "predictable" factor such as a mechanical or electrical element. See *Fisher*, 427 F.2d at 839, 166 U.S.P.Q. at 24. In this case, we agree with the PTO that appellants' limited disclosure does not enable one of ordinary skill to make and use the invention as now recited in claims 1-46 and 50-51 without undue experimentation.

Remaining dependent claim 47 recites a cyanobacterium which expresses the chim-eric gene of claim 1, wherein the cyanobac-terium is selected from among the genera *Anacystis* and *Synechocystis*. Claim 48, which depends from claim 47, is limited to the cyanobacterium *Synechocystis* 6803. The PTO did not separately address these claims, nor indicate why they should be treated in the same manner as the claims encompassing all types of cyanobacteria.

consider the effect of *Hogan* and its progeny on *Fisher's* analysis of when an inventor should be allowed to "dominate the future patentable in-ventions of others." *Fisher*, 427 F.2d at 839, 166 U.S.P.Q. at 24.

Although these claims are not limited to expression of genes encoding particular *Bacillus* proteins, we note what appears to be an extensive understanding in the prior art of the numerous *Bacillus* proteins hav-ing toxicity to various insects. The reject-ion of claims 47-48 under § 112 will not be sustained.

CONCLUSION

The rejection of claims 1-48 and 50-52 under 35 U.S.C. § 103 is reversed. The rejection of claims 1-46 and 50-51 under 35 U.S.C. § 112, first paragraph, is affirmed and the rejection of claims 47 and 48 there-under is reversed.

AFFIRMED-IN-PART, REVERSED-IN-PART.

MAYER, Circuit Judge, dissenting.

An appeal is not a second opportunity to try a case or prosecute a patent application, and we should not allow parties to "under-take to retry the entire case on appeal." *Perrini America, Inc. v. Paper Converting Machine Co.*, 832 F.2d 581, 584, 4 U.S.P.Q.2d 1621, 1624 (Fed.Cir.1987); *Ea-ton Corp. v. Appliance Valves Corp.*, 790 F.2d 874, 877, 229 U.S.P.Q. 668, 671 (Fed. Cir.1986). But that is precisely what the court has permitted here. The PTO con-ducted a thorough examination of the prior art surrounding this patent application and concluded the claims would have been obvi-ous. The board's decision based on the examiner's answer which comprehensively explains the rejection is persuasive and shows how the evidence supports the legal conclusion that the claims would have been obvious. Yet, the court ignores all this and conducts its own examination, if you will, as though the examiner and board did not exist. Even if I thought this opinion were more persuasive than the board's, I could

23. The first paragraph of § 112 requires nothing more than objective enablement. *In re Marzocchi*, 439 F.2d 220, 223, 169 U.S.P.Q. 367, 369 (CCPA 1971). How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is irrelevant. *Id.*

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not join it because it misperceives the role of the court.

The scope and content of the prior art, the similarity between the prior art and the claims, the level of ordinary skill in the art, and what the prior art teaches are all ques-tions of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545, 148 U.S.P.Q. 459, 467 (1966); *Jurgens v. McKasy*, 927 F.2d 1552, 1560, 18 U.S.P.Q.2d 1031, 1037 (Fed.Cir.1991). And "[w]here there are two permissible views of the evidence, the factfinder's choice be-tween them cannot be clearly erroneous." *Anderson v. City of Bessemer City*, 470 U.S. 564, 574, 105 S.Ct. 1504, 1511-12, 84 L.Ed.2d 518 (1985). The mere denom-ination of obviousness as a question of law does not give the court license to decide the factual matters afresh and ignore the re-quirement that they be respected unless clearly erroneous. *In re Woodruff*, 919 F.2d 1575, 1577, 16 U.S.P.Q.2d 1934, 1935 (Fed.Cir.1990); *In re Kulling*, 897 F.2d 1147, 1149, 14 U.S.P.Q.2d 1056, 1057 (Fed. Cir.1990). There may be more than one way to look at the prior art, but on this record we are bound by the PTO's interpre-tation of the evidence because it is not clearly erroneous and its conclusion is unassailable. I would affirm on that basis.



LEVERNIER CONSTRUCTION,
INC., Plaintiff-Appellee,

v.

The UNITED STATES, Defendant-
Appellant.

No. 91-5058.

United States Court of Appeals,
Federal Circuit.

Oct. 22, 1991.

Construction contractor sought attor-
ney fees and expenses under the Equal

Access to Justice Act (EAJA) after settle-ment of equitable adjustment claim. On original hearing, the Claims Court, Regi-nald W. Gibson, J., 21 Cl.Ct. 683, granted application in part and denied it in part. Contractor sought reconsideration. The Claims Court, 22 Cl.Ct. 247, granted the motion, and held that contractor was enti-tled to recover additional amount repre-senting consultant fees and expenses. Government appealed. The Court of Ap-peals, Bennett, Senior Circuit Judge, held that: (1) prosecution of equitable adjust-ment claim before contracting officer was not a "civil action" within meaning of the EAJA, and thus contractor was not entitled to recover consultant fees incurred in prep-eration of equitable adjustment claim; (2) Claims Court erred in applying 18% cost of living adjustment (COLA) to paralegal fees awarded under the EAJA; and (3) it was error to apply 18% (COLA) to hourly rates of attorneys whose time was claimed at \$75 an hour.

Reversed.

1. United States 6-147(12)

Prosecution of equitable adjustment claim before contracting officer was not "civil action" within meaning of the Equal Access to Justice Act (EAJA), and thus contractor was not entitled to recover fees incurred by contract claim consultant for preparation of equitable adjustment claim. 28 U.S.C.A. § 2412.

See publication Words and Phrases for other judicial constructions and definitions.

2. United States 6-147(5)

Equal Access to Justice Act (EAJA) is a waiver of sovereign immunity which must be strictly construed. 28 U.S.C.A. § 2412.

3. United States 6-147(4)

In formulating an award of attorney fees under the Equal Access to Justice Act (EAJA), court may adjust statutory cap governing rate of attorney fees upward to account for an increase in cost of living. 28 U.S.C.A. § 2412(d)(2)(A)(ii).

King argues that the wide disparity in punishments for crimes involving crack cocaine and those involving powder cocaine violates the Constitution's guarantee of equal protection in that it has a discriminatory impact on black persons. King argues that crack cocaine is predominantly used by blacks, and that powder cocaine is predominantly used by whites.¹ Thus, he argues that blacks are punished much more severely for using cocaine than are whites.

The parties agree that the appropriate level of scrutiny is the rational basis test, since King has not alleged a discriminatory intent on the part of Congress. Thus, we apply the rational basis test.²

[1, 2] To pass the rational basis test, the legislation must have a legitimate purpose, and it must have been reasonable for the lawmakers to believe that the use of the challenged classification would promote that purpose. *Western & Southern Life Insurance Co. v. State Board of Equalization*, 451 U.S. 648, 668, 101 S.Ct. 2070, 2083, 68 L.Ed.2d 514 (1981). We readily conclude that the sentencing scheme in question withstands scrutiny under the rational basis standard. The fact that crack cocaine is more addictive, more dangerous, and can be sold in smaller quantities than powder cocaine is sufficient reason for Congress to provide harsher penalties for its possession. *United States v. Watson*, 953 F.2d 895, 898 (5th Cir.), cert. denied, ___ U.S. ___, 112 S.Ct. 1989, 118 L.Ed.2d 586 (1992).

1. King has presented no evidence to support his claim, although he points to statistics utilized by the Minnesota Supreme Court in *Minnesota v. Russell*, 477 N.W.2d 886 (Minn.1991). In that case, the trial court found that in 1988, 96.6% of all persons charged with possession of cocaine base in Minnesota were black, and that 79.6% of persons charged with possession of powder cocaine were white. For the purposes of argument, we will assume that the statistical data gathered in Minnesota is similar to that which would be found in this circuit.

2. The other circuits that have addressed this issue have applied the rational basis test. See *United States v. Watson*, 953 F.2d 895, 898 (5th Cir.), cert. denied, ___ U.S. ___, 112 S.Ct. 1989, 118 L.Ed.2d 586 (1992); *United States v. House*, 939 F.2d 659, 664 (8th Cir.1991); *United States v. Thomas*, 900 F.2d 37, 39 (4th Cir.1990); *United States v. Cyrus*, 890 F.2d 1245, 1248 (D.C.Cir.

(1992). See also *United States v. House*, 939 F.2d 659, 664 (8th Cir.1991); *United States v. Thomas*, 900 F.2d 37, 39 (4th Cir.1990); *United States v. Cyrus*, 890 F.2d 1245, 1248 (D.C.Cir.1989).³

AFFIRMED.



In re John R. FRITCH.

No. 91-1318.

United States Court of Appeals,
Federal Circuit.

Aug. 11, 1992.

United State Patent and Trademark Office, Board of Patent Appeals and Interferences agreed with examiner's conclusion that claimed invention for landscape edging apparatus and method was invalid based on obviousness. Applicant appealed. The Circuit Judge, held that fact that prior art could be modified in manner suggested by examiner did not make modification obvi-

1989). See also *United States v. Solomon*, 848 F.2d 156, 157 (11th Cir.1988) (no heightened scrutiny of mandatory minimum sentence for possession of cocaine base with intent to distribute because § 841(b)(1) does not discriminate on the basis of a suspect classification or a fundamental right).

3. King also argues that the state and federal law enforcement agencies engaged in "de facto" sentencing, violating his right to due process. King contends that state criminal charges against him were dismissed in favor of prosecution in federal court, where the sentences for crimes involving crack cocaine are much harsher than in state court. King was charged with violations of both federal and state law. Because he could have been prosecuted in both state and federal court, we cannot conclude that his rights were violated because he was prosecuted only in federal rather than state court.

IN RE FRITCH

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ous unless prior art suggested desirability of modification.

Reversed.

1. Patents ¶32

In proceedings before Patent and Trademark Office, examiner bears burden of establishing prima facie case of obviousness based on upon prior art; patent applicant may then attack examiner's prima facie determination as improperly made out, or applicant may present objective evidence tending to support conclusion of nonobviousness. 35 U.S.C.A. § 103.

2. Patents ¶16.4, 16.7

Claimed invention for landscape edging apparatus and method was not invalid based on obviousness; mere fact that prior art could be modified in manner suggested by examiner did not make modification obvious unless prior art suggested desirability of modification. 35 U.S.C.A. § 103.

3. Patents ¶16(1)

It is impermissible to use claimed invention as instruction manual or "template" to piece together teachings of prior art so that claimed invention is rendered obvious and unpatentable. 35 U.S.C.A. § 103.

Charles L. Gholz, Oblon, Spivak, McClelland, Maier & Neustadt, Arlington, Va., argued, for appellant. John R. Fritch, Corpus Christi, Tex., was on the brief.

Jameson Lee, Associate Sol., Arlington, Va., argued, for appellee. With him on the brief was Fred E. McKelvey, Sol. Of counsel was Richard E. Schafer.

Before PLAGER, Circuit Judge, SMITH, Senior Circuit Judge, and RADER, Circuit Judge.

EDWARD S. SMITH, Senior Circuit Judge.

John R. Fritch (Fritch) appeals the February 1991 decision of the Patent and

1. Serial No. 06/838,721.

Trademark Office Board of Patent Appeals and Interferences (Board) affirming-in-part the Examiner's final rejection of the remaining claims in Fritch's application entitled *Landscape Edging Apparatus and Method*.¹ The Examiner concluded that Fritch's invention would have been obvious to one of ordinary skill in the art and was therefore unpatentable under 35 U.S.C. § 103. The Board, except for allowing claim 28, agreed. The Board's decision is reversed.

Issue

The issue is whether the Board erred in affirming the Examiner's determination that the prior art references of Wilson and Hendrix rendered the subject matter of Fritch's independent claims 1, 13, 24, and 29 obvious to one of ordinary skill in the art.

Background

In his final rejection, the Examiner rejected claims 1-24 and 27-30 of Fritch's application as unpatentable for obviousness under 35 U.S.C. § 103. Fritch appealed the final rejection to the Board. The Board affirmed the rejection as to claims 1-24, 29 and 30, entered a new ground of rejection for claim 27, and reversed as to claim 28. The Board agreed with the Examiner that the teachings of the Wilson and Hendrix patents rendered the subject matter of independent claims 1, 13, 24, and 29 obvious to one of ordinary skill in the art. Fritch does not appeal the Board's disposition as to claims 27 and 28, and at oral argument withdrew the appeal as to claim 8. The claims remaining in this appeal are 1-7, 9-24, 29 and 30.

The Fritch Invention

The invention claimed by Fritch involves a landscape edging device which includes a planar base portion and an upwardly extending retainer portion. The base portion is elongate, thin, flexible and has a planar bottom surface conformable to a varying slope ground surface. One longitudinal

edge of the base portion serves as a mowing strip and the other serves as a retaining flange for landscape fill. The upwardly extending retainer portion is integrally connected (e.g., fused) to the base portion and defines a longitudinally extending enclosed space. The Fritch invention is intended to be used as a retainer for landscape fill in order to separate unmowable landscape fill from the mowable lawn. It may also be used to secure a landscaping sheet to the ground, or to function as guards at the base of a fence. Independent claims 1 and 13 on appeal are representative of the subject matter claimed:

1. A landscape edging strip formed in its entirety of a thin gauge, flexible material and conformable to a ground surface of varying slope, comprising a continuous elongate, thin gauge, flexible base portion having a planar bottom surface conformable to said varying slope ground surface; a thin gauge, elongate retainer portion integral with said base portion and extending upwardly therefrom and transversely thereover to overlie a portion of said base portion; all of said retainer portion defining a longitudinally extending enclosed space; said retainer portion being integrally connected to said base portion adjacent one longitudinal edge of said base portion to define a mowing strip adjacent the other longitudinal edge of said base portion.

13. A landscape edging strip formed in its entirety from thin gauge, flexible material and conformable to a ground surface of varying slope, comprising a continuous elongate, thin gauge, flexible base portion having a planar bottom surface conformable to said varying slope ground surface; a thin gauge, elongate retainer portion integral with said base portion and extending upwardly therefrom and transversely thereover to overlie a portion of said base portion; all of said retainer portion defining a longitudinally extending enclosed space; said retainer portion being integrally connected to said base portion at a transverse location between the longitudinal edges of said base portion, thereby defining a longitudinally extending retaining flange on one side of said retainer portion and a mowing strip on the other side of said retainer portion.

The critical language in Fritch's independent claims is that the device is to be, in its entirety, both flexible and "conformable to a ground surface of varying slope". These limitations, although located in the claims' preambles, "are necessary to give meaning to the claim[s] and properly define the invention".² Figure 1 from Fritch's drawings is reproduced below:

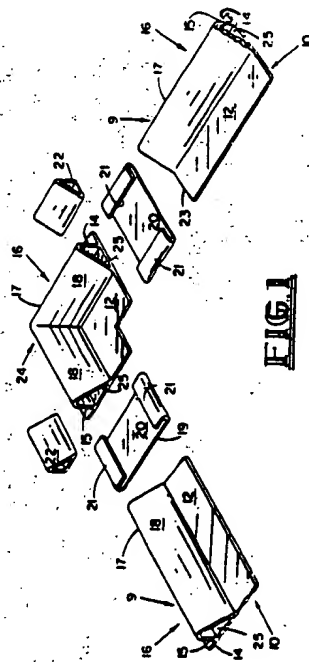


FIG. 1

2. *Perkin Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 896, 221 USPQ 669, 675 (Fed.Cir. 1984).

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The Prior Art

a. The Wilson Patent

The Wilson patent relied upon by the Examiner and the Board is entitled "Grass Edging and Watering Device".³ The embodiment of the Wilson device includes a substantially flat mowing strip extending horizontally from a longitudinally extend-

ing body portion. Opposite the mowing strip is a scored flange which may be broken off when not needed or wanted. Between the mowing strip and the flange, and extending vertically from the body portion is an anchoring leg. Located above the anchoring leg is the body portion which contains a water conduit and sprinkler head assembly. The device is intended to be used adjacent to the borders of walks and plant beds. Figures 1 and 4 from Wilson's drawings are reproduced below:

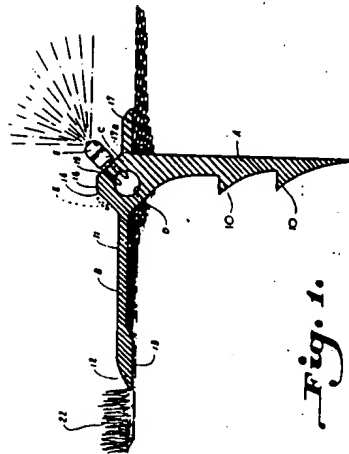


Fig. 1.

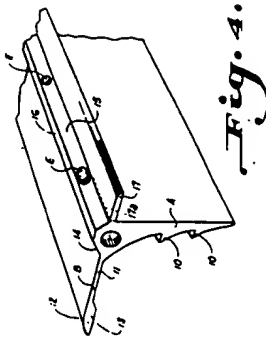


Fig. 4.

b. The Hendrix Patent

The Hendrix patent is entitled "Loose Material Retainer Strip".⁴ The Solicitor chose not to discuss the Hendrix reference in his brief, stating that the Board had deemed Hendrix unnecessary to its decision. The Solicitor overstates the Board's position. The Board based its decision upon "a collective evaluation of the Wilson and Hendrix patents". We include Hendrix in our discussion because it did play a role in the rejection of Fritch's independent claims.

The Hendrix device is composed of elongated, flexible strips having substantially C-shaped cross-section. The bottom lip of the device is to be wider than the top lip in order to facilitate fastening the device to the ground. The device will fit most gentle contours, and the top lip will yield laterally to build-up of gravel until the gravel can be redistributed. The concave portion of the strip is installed such that it faces the material to be retained in place. Hendrix contemplates that the retainer will be used

3. U.S. Patent No. 3,485,449.

4. U.S. Patent No. 4,349,596.

in retaining gravel in driveways, lining or concrete highways. Figure 1 of Hendrix's drawings is reproduced below:

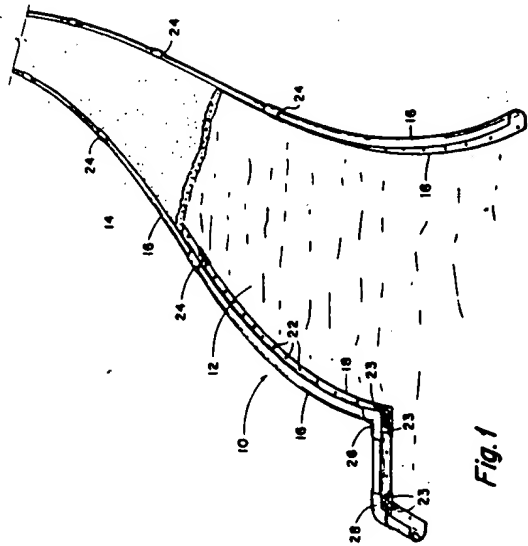


Fig. 1

Standard of Review

"[O]bviousness is a question of law to be determined from the facts."⁵ The obviousness determination "is based upon underlying factual inquiries concerning the claimed invention and the prior art" which are reviewed for clear error.⁶ However, it is the ultimate conclusion of obviousness which the Federal Circuit reviews as a matter of law.⁷

Teachings of Wilson

Fritch takes exception to the Examiner's findings of fact related to the teachings of the Wilson patent. The Examiner's rejection and the Board's opinion rely heavily on the use of Wilson in view of other references to declare the Fritch invention obvious. The Board states that it agrees with the Examiner's finding of fact regarding the

teachings of Wilson. In the Examiner's answer, which the Board quotes, the Wilson device is described as follows:

Wilson discloses a landscaping edging strip comprising a relatively thin gauge, elongated flexible base portion including a mower strip B having a planar bottom surface conformable to a varying slope surface.

The Board states that the Wilson reference presents "substantial evidence that Wilson is both thin and flexible." The Board regards the Wilson device as teaching that it is flexible and conformable in its entirety. This finding demonstrates clear error.

It is well settled that a prior art reference is relevant for all that it teaches to those of ordinary skill in the art.⁸ The base portion of Wilson is not planar in its

7. *In re De Blauwe*, 736 F.2d at 703, 222 USPQ at 195.

8. *Beckman Instruments Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 USPQ2d 1301, 1304 (Fed.Cir.1989).

5. *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed.Cir.1984).

6. *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1057 (Fed.Cir.1990).

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entirety, as the Board's opinion suggests, but also includes a prominent anchoring leg to secure the device to the ground. The anchoring leg, which runs the length of the Wilson device, would inhibit longitudinal flexibility of the Wilson device. Indeed, Wilson expressly contemplates flexibility and conformability *only* in the mower strip. Wilson states that its mower strip may be lifted in order to pack dirt thereunder for the purpose of securing the device to the ground. Fritch, on the other hand, is claimed to be flexible in its entirety. The Board's holding that Wilson is flexible in its entirety is based upon a misapprehension of the scope of Wilson's teachings.

Second, Wilson's anchoring leg prohibits conformability to the ground surface in the manner claimed by Fritch. The Examiner's description of Wilson as having a "planar bottom surface conformable to a varying slope surface" is applicable *only* in reference to the mower strip. This description, however, ignores the anchor leg and the fact that it must be placed *into* the ground. Wilson expressly teaches that the anchoring leg may be pushed into soft soils, but in harder terrain a trench is needed in order to place the Wilson sprinkler system. In order to install the Wilson apparatus, the ground surface must be altered to conform to the device rather than, as the Solicitor contends, that Wilson is freely conformable to the ground. Fritch, on the other hand, does not require such extensive alteration of the ground surface in order to install the device.

Prima Facie Obviousness

[1] In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art.⁹ "[T]he Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in

9. *In re Plasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed.Cir.1984).

10. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed.Cir.1988) (citing *In re Lala*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed.Cir. 1988)).

the art would lead that individual to combine the relevant teachings of the references."¹⁰ The patent applicant may then attack the Examiner's prima facie determination as improperly made out, or the applicant may present objective evidence tending to support a conclusion of nonobviousness.¹¹

[2] Fritch has attacked the Board's finding that the Examiner established that Fritch's claimed invention was prima facie obvious in view of the teachings of the prior art. The Board states that "a collective evaluation of the Wilson and the Hendrix patents would have rendered the subject matter of independent claims 1, 13, 24, and 29 obvious to one of ordinary skill." Fritch maintains that there is no teaching, suggestion, or incentive in the prior art to modify or to combine the teachings of the prior art in the manner suggested by the Examiner. We agree.

Wilson teaches a grass edging and watering device which includes an anchoring leg for securing the device to the ground. Wilson contemplates that a trench will need to be dug in order to allow the anchoring leg to be placed into the ground if the condition of the soil requires it. This anchoring leg prohibits flexibility and conformability over the length of Wilson. Any flexibility or conformability in Wilson, which the Board states extends to the entire device, is limited to the mower strip. It is only the mower strip that is mentioned as being flexible in order to aid installation. Hendrix has been cited for its teaching of a flexible retainer strip that is able to conform to the ground surface.

Wilson addresses the problems of arresting growth of grass between areas and watering plants without wetting sidewalks. Wilson lacks any suggestion or incentive to use its water conduit as a landscape retainer since this would arguably result in clogged sprinkler heads.¹² Wilson also

11. *In re Heldt*, 433 F.2d 808, 811, 167 USPQ 676, 678 (CCPA 1970).

12. This court has previously found a proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended pur-

teaches that its mower strip is flexible in order to allow dirt to be packed thereunder. There is no suggestion in Wilson to extend that flexibility to the entire device. Wilson also lacks any teaching or suggestion that one should remove the anchoring leg. Hendrix does not, simply by virtue of its flexible nature, suggest these extensive changes which the Board states are obvious. Neither Wilson nor Hendrix, alone or in combination, provide any incentive to combine the teachings of the prior art in the manner maintained by the Board.

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so." ¹³ Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.¹⁴ Wilson and Hendrix fail to suggest any motivation for, or desirability of, the changes espoused by the Examiner and endorsed by the Board.

[3] Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.¹⁵ This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the

pose. *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed.Cir.1984).

13. *ACS Hosp. Systems, Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984).

14. *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127.

15. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). See also *Interconnect*

prior art to deprecate the claimed invention." ¹⁶

Conclusion

The decision of the Board affirming the Examiner's rejection of independent claims 1, 13, 24, and 29 of Fritch's application as unpatentable over the prior art under 35 U.S.C. § 103 is reversed. Since dependent claims are nonobvious if the independent claims from which they depend are nonobvious, the Board's affirmation of the rejection of dependent claims 2-7, 9-12, 14-23, and 30 is also reversed.¹⁷

REVERSED.



THE UNITED STATES,
Plaintiff-Appellee,

v.

COMMODITIES EXPORT CO.,
Defendant-Appellant,
and

Old Republic Insurance Co.,
Defendant-Appellant.

Nos. 91-1470, 91-1482.

United States Court of Appeals,
Federal Circuit.

Aug. 11, 1992.

Government brought action to recover unpaid liquidated damages under customs warehouse bond. The United States Court *Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985).

16. *In re Fine*, 837 F.2d at 1075, 5 USPQ2d at 1600.

17. *In re Fine*, 837 F.2d at 1076, 5 USPQ2d at 1600 (citing *Harness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed.Cir.1987)). See also *In re Sernaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed.Cir.1983) (when argued together, dependent claims stand or fall with the independent claims from which they depend).

of International Trade, Nicholas Tsoulacas, J., entered judgment in favor of government, and appeal was taken. The Court of Appeals, Rader, Circuit Judge, held that, for actions founded on contract, action was time barred, as Customs' delay in bringing suit until after it had complied with regulations for demanding payment did not affect accrual of action.

Reversed.

1. Customs Duties ¶84(1)

In order to fall within exclusive jurisdiction of Court of International Trade, action to recover on bond must be begun by United States, and must arise out of import transaction, and must relate to importation of merchandise required by laws of United States or by Secretary of Treasury.

2. Customs Duties ¶84(1)

For purposes of determining whether action to recover on bond falls within exclusive jurisdiction of Court of International Trade, foreign goods in bonded warehouse are "imported" on entry into United States. 28 U.S.C.A. §§ 1582, 1582(2).

3. Customs Duties ¶84(1)

For purposes of determining whether action to recover on bond falls within exclusive jurisdiction of Court of International Trade, bond related to importation of merchandise where it dealt with documentation and manipulation of imported merchandise in bonded warehouse and insured payment of duties on imported merchandise in event that duties became payable. 28 U.S.C.A. §§ 1582(2), 2415(a); Tariff Act of 1930, § 621, as amended, 19 U.S.C.A. § 1621.

4. Customs Duties ¶84(3)

Action to recover liquidated damages under terms of bond agreement was "founded upon a contract" and thus was subject to six-year limitation period and not five-year limitations period applicable to cases in which government sought pecuniary penalties accruing under customs law. 28 U.S.C.A. §§ 1582(2), 2415(a); Tariff Act of 1930, § 621, as amended, 19 U.S.C.A. § 1621.

Cite as 972 F.2d 1266 (Fed.Cir. 1992)

5. Limitation of Actions ¶43

Under federal law governing statutes of limitations, cause of action accrues when all events necessary to state claim occur.

6. Limitation of Actions ¶47(3)

Action brought by government to recover unpaid liquidated damages under customs warehouse bond was time barred under six-year limitations period for actions founded on contract, fact that Customs unilaterally adopted regulations which delayed filing of action until Customs had given notice and waited 60 days for response did not change accrual of limitations period. 28 U.S.C.A. §§ 2415, 2416, 2416(c).

Mark S. Sochaczewsky, Atty., Commercial Litigation Branch, Dept. of Justice, New York City, argued, for plaintiff-appellee. With him on the brief, were Stuart M. Gerson, Asst. Atty. Gen., David M. Cohen, Director and Joseph I. Liebman, Atty. in Charge, Intern. Trade Field Office. Also on the brief was Michele L. Kenney, U.S. Customs Service, of counsel.

Roger E. Craig, Naples, Fla., argued, for defendant-appellant, Commodities Export Co. With him on the brief, was Walter H. Lubinski, Lubinski & Lubinski, Detroit, Mich. Wayne James Jarvis, Wayne Jarvis Ltd., Chicago, Ill., argued, for defendant-appellant, Old Republic Ins. Co. With him on the brief was Michael G. Hodes, Hodes & Flon, Chicago, Ill., of counsel.

Before ARCHER, Circuit Judge, BENNETT, Senior Circuit Judge, and RADER, Circuit Judge.

RADER, Circuit Judge.

The United States sued Commodities Export Company and Old Republic Insurance Company in the United States Court of International Trade to recover unpaid liquidated damages under a customs warehouse bond. The trial court entered judgment in favor of the United States. *United States v. Commodities Export Co. & Old Republic Ins. Co.*, CIT No. 89-08-00144, May 14, 1991. Because the United States did not file its action within the six year statute of

flex was whether rubber hose should be considered as prior art relevant to the claimed PTFE tubing. In finding that rubber hose was prior art, the court focused on only the second step of the two-step test for nonanalogous art which test had been stated in *Wood* in the following terms:²

The determination that a reference is from a nonanalogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

Here, the references satisfy the first inquiry because they are "within the field of the inventor's endeavor" of horizontally reciprocating, double-acting piston devices for moving fluids. We agree with the board that the cited pumps and compressors have essentially the same function and structure: they move fluids by means of a double-acting piston, a cylinder, and valves.³ Consequently, the field of endeavor is the same for an inventor of either a pump or a compressor of the double-acting piston type.⁴ Thus, the Pocock "pump" was correctly considered as prior art for the Deminski "compressor." It is even more clear that the British and Kovach references are within Deminski's field of endeavor because they are directed to *compressors* having horizontally reciprocating, double-acting pistons.

2. *Wood*, 559 F.2d at 1036, 202 USPQ at 174.

3. See *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) (cross reference in official search notes is some evidence of analogy, although "the similarities and differences in structure and function of the inventions disclosed in the references . . . carry far greater weight"). The nearly identical classifications of the application and references in the present case are the result of the close similarity in structure and function of the invention and the prior art.

4. Deminski argues at length that the scope of his claims is limited by the language "a high-pres-

B. *Whether Deminski's Invention Would Have Been Obvious.*

We affirm the board's decision insofar as it affirms the examiner's rejection of claims 1, 3, 6, and 7 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British Patent No. 1,322,774 and Shallenberg. The examiner and the board correctly found that it would have been obvious in view of the British reference to add two more valve chambers to Pocock and in view of Shallenberg to move the cylinder upwardly so that it is above the bottom of the valve chambers.

We also affirm the rejection of claim 2 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British reference, Shallenberg, and further in view of Kovach, which teaches the use of a piston ring in a double-acting piston pump.

[2] We reverse the board's decision insofar as it affirms the examiner's rejection of claims 17, 18, and 21. The latter claims have the limitation that the valve sets in each valve chamber be connected in a way which will permit them to be withdrawn as a unit. There is nothing in the prior art references, either singly or in combination, "to suggest the desirability, and thus the obviousness," of designing the valve assembly so that it can be removed as a unit.⁵

Simply put, Deminski solved the problem of how to remove the valve assembly by designing a compressor with four vertically oriented valve chambers. Each chamber

sure gas transmission compressor." We need not decide whether the preamble is limiting in this case because the prior art would be the same for either pumps or compressors of the double-acting piston type. We acknowledge, however, that the prior art did not address Deminski's problem of how to remove a large and heavy valve assembly as a unit.

5. *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556, 225 USPQ 26, 31 (Fed.Cir.1985) (quoting *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed.Cir.1984)) (emphasis added in *Fromson*).

Cite as 796 F.2d 443 (Fed. Cir. 1986)

contains a valve assembly which can be removed as a unit through the opening at the top of the valve chamber. Each of the four valve assembly units may be removed relatively easily by lifting vertically with a hoist.

Pocock teaches a pump in which only the valve stem is separately removable and replaceable. The Pocock structure requires the valve pieces to be removed item-by-item, by turning the pump upside down, by using a tool, or by hand. Because the Pocock structure is typically small, Pocock does not address Deminski's problem of how to remove a large and heavy valve assembly as a unit. Instead, Pocock teaches away from the invention of claims 17, 18, and 21 of Deminski's patent application.

There was no suggestion in the prior art to provide Deminski with the motivation to design the valve assembly so that it would be removable as a unit. The board argues that if Pocock had followed the "common practice" of attaching the valve stem to the valve structure, then the valve assembly would be removable as a unit. The only way the board could have arrived at its conclusion was through hindsight analysis by reading into the art Deminski's own teachings. Hindsight analysis is clearly improper, since the statutory test is whether "the subject matter as a whole would have been obvious at the time the invention was made."⁶

Conclusion

We affirm the board's decision insofar as it affirmed the examiner's rejection of claims 1-3, 6, and 7 in Deminski's patent application. We reverse the board's decision insofar as it affirmed the examiner's rejection of claims 17, 18, and 21 as unpatentable over the prior art under 35 U.S.C. § 103.

AFFIRMED IN PART, REVERSED IN PART.

6. 35 U.S.C. § 103 (1982); *In re Spinnoble*, 405

BAUSCH & LOMB, INC., Appellant,

BARNES-HIND/HYDROCURVE, INC.,
and Barnes-Hind International,
Inc., Appellees.

Appeal No. 85-2578.

United States Court of Appeals,
Federal Circuit.

July 14, 1986.

Suit was brought alleging the infringement of patent No. 4,194,814 disclosing an engraved contact lens and providing a method of engraving using a source of high intensity electro-magnetic energy. Defendant counterclaimed alleging that the patent was invalid. The United States District Court for the Northern District of California, Robert P. Aguilar, J., found the patent invalid and not infringed, and the plaintiff appealed. The Court of Appeals, Nichols, Senior Circuit Judge, held that the district court improperly determined that the patent was obvious; court failed to make the *Graham* inquiries, improperly focused on what was obvious to the inventor, engaged in hindsight analysis and considered evidence that was not prior art. Vacated and remanded.

1. Patents Φ 112.1

A patent is presumed valid and each claim is presumed valid independently of the validity of other claims. 35 U.S.C.A. § 282.

2. Patents Φ 312(11/4)

Burden is on party asserting invalidity of a patent to prove it with facts supported by clear and convincing evidence.

3. Patents Φ 112.1

By merely holding that defendants had proved by clear and convincing evidence F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969).

that the patent and each of its claims was invalid and therefore void, trial court improperly denied the patent its statutory presumption of validity as to each claim. 35 U.S.C.A. § 282.

4. Patents \S 312(6)

When prior art before court is same as that before PTO, burden on the party asserting invalidity is more difficult to meet.

5. Patents \S 16(2, 3), 36.1

Obviousness of a patent is a question of law based on the following underlying factual inquiries: scope and content of the prior art, difference between prior art and the claims at issue, level of ordinary skill in the art, and objective evidence of secondary considerations. 35 U.S.C.A. § 103.

6. Patents \S 16.14

District court improperly determined that patent No. 4,194,814 disclosing an engraved contact lens and providing a method of engraving using a source of high intensity electro-magnetic energy was obvious; court failed to make the *Graham* inquiries, improperly focused on what was obvious to the inventor, engaged in hindsight analysis and considered evidence that was not prior art. 35 U.S.C.A. § 103.

7. Patents \S 16(2, 4)

To determine whether a reference is within scope and content of the prior art, court must first determine if the reference is within field of inventor's endeavor and if it is not, then consider whether the reference is reasonably pertinent to the particular problem with which inventor was involved; furthermore, the art must have existed as of date of invention, presumed to be the filing date of the application until an earlier date is proved. 35 U.S.C.A. § 103.

8. Patents \S 16(1)

In determining obviousness, court must view claimed invention as a whole. 35 U.S.C.A. § 103.

9. Patents \S 36.1(3, 4), 36.2(1)

"Secondary considerations," such as commercial success, long felt but unresolved needs and failed attempts, must be

considered, when present, in determining obviousness of an invention. 35 U.S.C.A. § 103.

10. Patents \S 235(2)

"Smooth" for purposes of determining infringement of patent No. 4,194,814 disclosing an engraved contact lens providing method of engraving using a source of high intensity electro-magnetic energy, meant smooth enough to serve the inventor's purposes, i.e., not to inflame or irritate the eyelid of the wearer or be perceived by him at all when in place.

See publication Words and Phrases for other judicial constructions and definitions.

Laurence H. Pretty, Pretty, Schroeder, Brueggemann & Clark, Los Angeles, Cal., argued for appellant. With him on brief was Craig S. Summers. Bernard D. Bogdin and Howard S. Robbins, Bausch & Lomb, Inc., Rochester, N.Y., were also on brief.

John M. Calimafde, Hopgood, Calimafde, Kalil, Blaustein & Judlowe, New York City, argued for appellees. With him on brief were Eugene J. Kalil and Dennis J. Mondolino. Gilbert W. Rudman, Revlon Inc., Tuckahoe, N.Y., of counsel.

Before MARKEY, Chief Judge, FRIEDMAN, Circuit Judge, and NICHOLS, Senior Circuit Judge.

NICHOLS, Senior Circuit Judge.

Appellant Bausch & Lomb, Inc. filed suit in the United States District Court for the Northern District of California, alleging that appellee Barnes-Hind/Hydrocurve, Inc. and Barnes-Hind International, Inc. (hereinafter Barnes-Hind) infringed patent No. 4,194,814 ('814 patent) in the manufacture and sale of its laser-marked contact lenses. Barnes-Hind denied infringement and counterclaimed that the '814 patent was invalid, void, and unenforceable. In No. C-83-20283-RPA, Judge Aquilar found the patent invalid for obviousness and not infringed. We vacate and remand.

Appellee Barnes-Hind relied to a large extent on deposition testimony which was never introduced into evidence. Because this testimony was not in evidence, it would have been improper for us to consider it and, therefore, we did not. This eliminated much of Barnes-Hind's arguments on appeal.

Background

1. The Technology

Vision correcting contact lenses have become familiar; hard contact lenses were introduced in the early 1950's and soft lenses in 1971. Toric contact lenses, which correct for the eye condition known as astigmatism, have a similar history of usage: hard lenses from the early 1950's and soft from the first half of the 1970's. Toric lenses differ from standard contact lenses in having a prism base, i.e., one edge portion of the lens is thicker. Proper prescription and fitting of toric lenses on the cornea of the eye requires alignment of a central lens axis with this prism base. Markings on the contact lens surface greatly facilitate the fitting process.

Inks and other substances have been used since the early 1950's, however, those marking procedures suffer several disadvantages: difficulty of accurate application with possible FDA disapproval; possibility of dissolution, blurring, and allergic reactions. Mechanical marking, as with a sharp scribing tool or an abrading tool such as a dental bur, is also available, but not without its problems: inaccurate and inconsistent positioning of the mark, lens damage, inadequate visibility, and the expense and time involved.

2. The Patent

The '814 patent, entitled Transparent Ophthalmic Lens having Engraved Surface Indicia, discloses an engraved contact lens and provides a method of engraving using a source of high intensity electro-magnetic energy, such as a laser. The mark, not as deep as the lens is thick, is surrounded by a smooth surface of unsublimated or unfused polymer material with the result

An ophthalmic lens adapted to be placed

in direct contact with eye tissue formed of a transparent cross-linked polymer material, said lens being characterized by identifying indicia engraved in a surface thereof by subjecting said lens to a beam of radiation emerging from a laser having an intensity and wavelength at least sufficient to sublimate said polymer and form depressions in said lens surface to a depth less than the thickness of said lens, said lens having a smooth surface of unsublimated polymer material surrounding said depressions, and by varying in a predetermined manner the point at which said laser beam impinges upon said lens surfaces to engrave said identifying indicia in said lens surface.

Claim 2 depends from claim 1 with the limitation that the lens is formed by a cross-linked hydrophilic (water loving) polymer. Claim 7, a product claim, is similar to claim 1 but defines the depressions as relieved zones.

3. The Dispute

In February 1976, Mr. Donald Hager, then production manager at the Milton Roy Company, a manufacturer of soft contact lenses which was purchased by appellant Bausch & Lomb in 1979, sent to Carco, Inc., a distributor of laser equipment, six soft contact lenses for laser marking. At least two lenses were successfully marked. Around September 1976, Dr. David Fisher and Mr. James A. McCandless, also of Milton Roy Company, met with Mr. Hager to debrief him on the work. Soon thereafter, Mr. Hager resigned.

Dr. Fisher and Mr. McCandless continued to work on the lens-marking system, and in November 1977 filed an application for the patent in suit, listing themselves and Mr. Hager as inventors. Mr. Hager declined to execute the patent application, being at that time the employee of another lens manufacturing company, Sautlon In-

ternational, Inc. and saying that he had not "invented anything in connection with laser marking of contact lens." He further said that he could not execute documents, under oath or otherwise, that represent the contrary. The Patent and Trademark Office (PTO) initially, and on a second occasion, rejected all the claims as obvious over two prior art U.S. patents to Brucker (No. 3,833,786) (teaching the use of a laser to fenestrate, i.e., make holes, in contact lens to allow circulation of fluid through the lens) and to Caddell (No. 3,549,733) (disclosing the use of a laser to remove plastic from the surface of a printing plate to form a pattern). The PTO later issued the patent in 1980 as limited to a transparent cross-linked polymer having a smooth surface around the mark. Mr. Hager did sign as inventor in 1982. Meanwhile, Milton Roy commenced manufacture and marketing of laser-marked soft contact lenses in 1978.

Barnes-Hind's predecessor, Continuous Curve, Inc., introduced under the trademark HYDROCURVE a line of soft toric lenses around 1975-76 that were marked with an indentation by a bur. In 1981, Barnes-Hind offered a soft toric lens marked by a laser.

Bausch & Lomb filed suit, contending that certain laser-marked contact lenses manufactured and sold by Barnes-Hind infringe claims 1, 2, and 7 of the '814 patent. Barnes-Hind denied infringement and counterclaimed that the patent was invalid, void, and unenforceable. The parties narrowed the issue of infringement to whether the marks on the HYDROCURVE lenses are surrounded by a smooth surface of unsublimated polymer material with respect to claims 1 and 2 or a smooth and unaffected surface for claim 7.

4. The District Court Proceedings

The district court determined that Barnes-Hind "proved by clear and convincing evidence that the patent in suit (4,194,814) and each of its claims is invalid and therefore void." It concluded that the differences between the claims and the prior

art would have been obvious, finding that "the fact that the claimed subject matter of the patent in suit was obvious to Mr. Hager is most indicative of the obviousness of the invention," and that "Dr. Brucker's experiments in laser marking contact lenses are further evidence in support of this court's finding of obviousness." The court further concluded that scanning electron microscope (SEM) photographs, showing "that the surface of these lenses surrounding the laser mark are not 'smooth and unsublimated' or 'unaffected' as those terms were defined by plaintiff [appellant] during the processing of the patent in suit," demonstrated lack of infringement in any case. Bausch & Lomb appealed.

Opinion

The judgment is premised on several legal errors: (1) disregard of the presumption of validity established by 35 U.S.C. § 282; (2) absence of the factual findings on the four inquiries mandated by *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94; 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966); and (3) improper claim construction leading to the conclusion of noninfringement. We vacate the court's opinion and remand for a determination consistent with this opinion.

1. Presumption of Validity

[1, 2] A patent shall be presumed valid, and each claim shall be presumed valid independently of the validity of other claims. 35 U.S.C. § 282. The burden is on the party asserting invalidity to prove it with facts supported by clear and convincing evidence. *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 872, 228 USPQ 90, 97 (Fed.Cir.1985); *Jones v. Hardy*, 727 F.2d 1524, 220 USPQ 1021 (Fed.Cir.1984).

[3] The record contains no reference to this statutory presumption of validity, nor does it appear that the district court considered separately the validity of the three claims at issue. By merely holding that "defendants have proved by clear and convincing evidence that the patent in suit (4,194,814) and each of its claims is invalid

and therefore void," the district court improperly denied the '814 patent its statutory presumption of validity as to each claim.

The district court thought the examiner had been misled. Barnes-Hind argued and argues here that Bausch & Lomb (or rather its later acquired company Milton Roy) misled the examiner during prosecution. Appelles assert that "if the examiner had been correctly and forthrightly informed of Hager's and McCandless' opinions, the chemistry of the Brucker lens, and the teaching of the Caddell patent, he would not have issued the patent." The record, however, does not support this assertion.

The examiner did know of Hager's temporary refusal to execute the application during prosecution and, as discussed more fully *infra*, a determination of nonobviousness is based, *inter alia*, on the opinion of a hypothetical person of ordinary skill in the art, not on the inventors' opinion. The weight to be attached to Hager's refusal cannot be exaggerated as the court below has done without clear error in view of Hager's self interest as an employee of a competitor and his later change of position. Instances of inventors refusing even to cooperate in obtaining issuance of a patent to be owned by an assignee are common and machinery is provided in 37 C.F.R. § 1.47 to deal with them. Section 1.47 provides that either a joint inventor or a proper assignee may file the application without the consent or signature of the inventor, just so the oath or declaration is accompanied by a petition including proof of pertinent facts. It is clear, therefore, that the PTO does not allow the inventor to erect that type of obstacle to obtaining patent protection. Such forethought is necessary, as otherwise an inventor's changed self interest might nullify a proper assignment. The district court's heavy reliance on Mr. Hager's assertions, if persisted in, would allow a co-inventor another chance at sabotage if the first effort has failed.

Finally, the examiner, who with the deference we owe governmental officials we assume has some expertise in interpreting

the references and some familiarity with the level of skill in the art, *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359, 220 USPQ 763, 770 (Fed. Cir.), *cert. denied*, — U.S. —, 105 S.Ct. 95, 83 L.Ed.2d 41 (1984), did have the Brucker and Caddell patents before him. Barnes-Hind's "misleading the examiner" contention is insufficiently supported to overcome the presumption of validity.

[4] As a final matter, we recognize, as the district court did not, that when the prior art before the court is the same as that before the PTO, the burden on the party asserting invalidity is more difficult to meet. *American Hoist*, 725 F.2d at 1359, 220 USPQ at 770.

2. Graham Findings

[5] Obviousness under 35 U.S.C. § 103 is a question of law based on the underlying factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966): (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) objective evidence of secondary considerations. See, e.g., *Loctite*, 781 F.2d at 872, 228 USPQ at 97-98.

The *Loctite* court further stated:

In patent cases, the need for express *Graham* findings takes on an especially significant role because of an occasional tendency of district courts to depart from the *Graham* test, and from the statutory standard of obviousness that it helps determine, to the tempting but forbidden zone of hindsight. Thus we must be convinced from the opinion that the district court actually applied *Graham* and must be presented with enough express and necessarily implied findings to know the basis of the trial court's opinion.

Id., 781 F.2d at 872, 228 USPQ at 98.

[6] Here, as in *Loctite* and in *Jones*, we are not convinced that the district court applied the *Graham* findings. Instead, it found Mr. Hager's opinion that the subject

matter was obvious "most indicative of the obviousness of the invention." This was legal error.

Unlike the district court, we have the benefit of the very clear exposition of the law in *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454, 227 USPQ 293, 297-98 (Fed.Cir.1985):

The issue of obviousness is determined entirely with reference to a *hypothetical* "person having ordinary skill in the art." It is only that hypothetical person who is presumed to be aware of all the pertinent art. The actual inventor's skill is irrelevant to this inquiry, and this is for a very important reason. The statutory emphasis is on a person of *ordinary* skill. Inventors, as a class, according to the concepts underlying the Constitution and the statutes that have created the patent system, possess something—call it what you will—which sets them apart from the workers of *ordinary* skill, and one should not go about determining obviousness under § 103 by inquiring into what *patentees* (i.e., inventors) would have known or would likely have done, faced with the revelation of references. [Emphasis in original.]

In this regard then, the district court erred at least three times: it relied too heavily on the alleged opinion of one who was an inventor and patentee, and misused that opinion as a substitute for determining the level of skill of the hypothetical person of ordinary skill and what that person would have been able to do when in possession of the prior art, the scope and contents of which the court should also have determined.

The court also engaged in improper hindsight analysis to conclude the '814 patent would have been obvious. The court essentially adopted Barnes-Hind's argument that "the concept of forming ridgeless depressions having smooth rounded edges using a laser beam to vaporize the material is explicitly disclosed in the Caddell patent. This is *exactly* the same process claimed in the patent-in-suit and practiced by the plaintiff."

Barnes-Hind selected a single line out of the Caddell specification to support the above assertion: "one way in which this [forming ridgeless depressions] can be achieved is to use a laser with high enough intensity to vaporize the plate material without melting it." Col. 5, lines 53-54. This statement, however, was improperly taken out of context. As the former Court of Customs and Patent Appeals held:

It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art. *In re Westlau*, 353 F.2d 238, 241, 147 USPQ 391, 393 (CCPA 1965); see also *In re Mercer*, 515 F.2d 1161, 1165-66, 185 USPQ 774, 778 (CCPA 1975).

A full appreciation of Caddell's statement requires consideration of the immediately following sentences in the same paragraph and the paragraph after that. Viewed in that context, it is apparent that Caddell's ideal printing plate would have no ridges around the depression. The use of a high intensity laser is offered as a possible means to achieve the goal but is limited by several disadvantages. To overcome these disadvantages, Caddell suggests the use of a special class of polymer that forms ridgeless depressions. A complete reading demonstrates quite clearly that Caddell is setting up a strawman and pointing out its disadvantages to highlight the advantages of Caddell's invention, that special class of polymers. The district court improperly viewed an isolated line in Caddell in light of the teaching of the '814 patent to hold for obviousness. This is improper hindsight analysis.

The district court also failed to consider the Caddell reference in its entirety and thereby ignored those portions of the reference that argued against obviousness. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed.Cir.1983), *cert. denied*, — U.S. —, 105 S.Ct. 172, 83 L.Ed.2d 107 (1984).

Cite as 796 F.2d 443 (Fed. Cir. 1986)

Caddell compared the ridge formation of his special class of polymers against, *inter alia*, Lucite, a copolymer composed of ethyl acrylate with methylmethacrylate—very similar to the chemical referred to in the '814 patent—and found that *only* his special class formed depressions without ridges. Thus, Caddell actually taught away from laser etching of soft contact lenses.

As further evidence of obviousness, the district court relied on Dr. Brucker's experiments in laser marking contact lenses. This too was error, in this case clearly erroneous factual error. The record does not support, indeed it contradicts, the supposition that Dr. Brucker had engaged in laser marking of soft contact lenses at the time of the present invention. On page 385 of the Appendix, in reply to Mr. Calimafde's question "when did Continuous Curve begin to experiment with laser marking of soft contact lenses?", Dr. Brucker replied "I believe it was in '79—'79, '80, somewhere in that area." The filing date of the '814 patent was November 10, 1977. Brucker's 3,838,786 patent for a method of fenestrating (putting windows in) contact lenses applies according to its claims to such lenses, both soft and hard. However, the record reflects that the need for such fenestration was as a mode of escape for fluid accumulating between the lens and the eye. Such a need does not exist respecting the soft lenses, the principal subject of the claims in suit, of which claim 2 is expressly limited to soft lenses. They, being hydrophilic, absorb the fluid.

In sum, the district court improperly determined the '814 patent was obvious: it failed to make the *Graham* inquiries, it improperly focused on what was obvious to the inventor, it engaged in hindsight analysis, and it considered evidence that was not prior art. This court, as an appellate court, may not make the required *Graham* factual findings, and must therefore remand that determination to the district court. The district court should not ignore the four-part analysis the authorities require.

a. *The scope and content of prior art*

[7] To determine whether a reference is within the scope and content of the prior art, first determine if the reference is within the field of the inventor's endeavor. If it is not, then next consider whether the reference is reasonably pertinent to the particular problem with which the inventor was involved. *In re Richard M. Deminski*, 796 F.2d 436, 442 (Fed.Cir.1986); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983). *Orthopedic Equipment Co., Inc. v. United States*, 702 F.2d 1005, 1008-11, 217 USPQ 193, 196-97 (Fed.Cir.1983) focused on the claims in suit, the art the PTO applied to the claims, and the nature of the problem confronting the inventor. Further, the art must have existed as of the date of invention, presumed to be the filing date of the application until an earlier date is proved.

b. *The differences between the claimed invention and the prior art*

[8] The court must view the claimed invention as a whole. See, e.g., *Jones*, 727 F.2d at 1527-28, 220 USPQ at 1024. We add, as a cautionary note, that the district court appeared to distill the invention down to a "gist" or "core," a superficial mode of analysis that disregards elements of the whole. It disregarded express claim limitations that the product be an ophthalmic lens formed of a transparent, cross-linked polymer and that the laser marks be surrounded by a smooth surface of unsublimated polymer. See also, *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 221 USPQ 929 (Fed.Cir.1984).

c. *Level of ordinary skill in the art*

In *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 697, 218 USPQ 865, 868-69 (Fed.Cir.1983), *cert. denied*, 464 U.S. 1043, 104 S.Ct. 709, 79 L.Ed.2d 173 (1984), the court listed six factors relevant to a determination of the level of ordinary skill: educational level of the inventor, type of problems encountered in the art, prior art solutions, rapidity of innovation, so-

Cite as 796 F.2d 451 (Fed. Cir. 1986)

plication of technology, and educational level of active workers in the field. As to educational level of the inventor, see *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 227 USPQ 293 (Fed.Cir.1985); *Orthopedic Equipment Co. v. All Orthopedic Appliances*, 707 F.2d 1376, 1382, 217 USPQ 1281, 1285 (Fed.Cir.1983) ("Although the educational level of the inventor may be a factor in determining the level of ordinary skill in the art, it is by no means conclusive.")

d. *Objective indicia of obviousness*

[9] Such "secondary considerations," when present, must always be considered. *Stratoflex*, 713 F.2d at 1538. See also *Cable Electric Products, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1026-28, 226 USPQ 881, 887-88 (Fed.Cir.1985). Such evidence includes commercial success, long felt but unresolved needs, and failed attempts. *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 895-96, 221 USPQ 669, 675 (Fed.Cir.), cert. denied, — U.S. —, 105 S.Ct. 187, 83 L.Ed.2d 120 (1984).

We shall vacate the trial court's opinion and remand for an obviousness determination consistent with this opinion.

3. *Infringement*

[10] The parties narrowed the infringement issue for trial to the question whether the surface of Barnes-Hind lenses surrounding the laser mark is "smooth and unsublimated" or "unaffected." The district court concluded that "the laser-engraved depressions in the surface of the HYDROCURE II lenses have been examined by scanning electron microscope. These photographs show that the surface of these lenses surrounding the laser mark are not 'smooth and unsublimated' or 'unaffected' as those terms were defined by plaintiff during the prosecution of the patent in suit." Appellant Bausch & Lomb argues on appeal that the trial court's approach of assessing smoothness at the very high levels of magnification obtainable by a SEM exceeds the level of smoothness required in the claims. We agree.

Because the first step in determining infringement is claim construction, improper claim construction can distort the entire infringement analysis. *Moeller v. Ionetics, Inc.*, 794 F.2d 653, 656 (Fed.Cir. 1986). Such a distortion occurred below.

Disputed issues such as the meaning of the term "smooth," should be construed by resort to extrinsic evidence such as the specification, other claims, and the prosecution history. Here, resort to the specification clearly demonstrates that "smooth" meant that "the edges of the craters neither inflame nor irritate the eyelid of the lens wearer The markings provided on the lens surface in accordance with this invention . . . are not perceived by the lens wearer" The prosecution history supports this construction. A reading of the amendment and its accompanying remarks demonstrates that smooth means the absence of a ridge that "would scratch either the eye or eyelid and would lead to infection." There is no indication that smooth means absolutely ridge-free. (This review of the prosecution history also leads us to disagree with Barnes-Hind's final argument that the prosecution history estops Bausch & Lomb from asserting infringement against the allegedly ridged HYDROCURE lens.) Testimony from Dr. Mandell, Bausch & Lomb's expert in the field of contact lenses, indicates that to a person of ordinary skill in the art, smooth would mean an absence of "roughness or significant elevation" so that a wearer "would not feel it with the eyelid." Further, there is testimony that a person of ordinary skill in the art would use an optical microscope, not an SEM, to gauge the relative smoothness of an etched contact lens.

We hold that smooth means smooth enough to serve the inventor's purposes, i.e., not to inflame or irritate the eyelid of the wearer or be perceived by him at all when in place. Accordingly, we vacate the district court's conclusion that the surface of the HYDROCURE lenses are not smooth or unaffected, and remand for a determination of infringement based on the proper construction of and proper test for smooth.

Conclusion

We vacate the district court's determination that the '814 patent is invalid and remand for a reconsideration of validity in light of the presumption of validity and the *Graham* findings on obviousness. We further vacate the decision of noninfringement and remand for proper claim construction and infringement analysis.

VACATED AND REMANDED.



Robert W. HEINEMANN, Appellant,

v.

the UNITED STATES, Appellee.

Appeal No. 85-2732.

United States Court of Appeals,
Federal Circuit.

July 17, 1986.

Former government employee brought action against United States claiming patent infringement. The United States Claims Court, Alex Kozinski, C.J., dismissed the claim and held that the United States was owner of the patent, and former employee appealed. The Court of Appeals, Edward S. Smith, Circuit Judge, held that: (1) Executive Order relating to ownership determinations on inventions made by government employees was constitutional, and (2) United States was owner of patent on intelligent antiarmor munition invention which bore direct relation to and was made in consequence of official duties of employee.

Affirmed.

1. Administrative Law and Procedure
§=704

Patents §=94

Patents and Trademarks Commission's review of determination by agency employing inventor as to government's interest in invention constitutes final agency action, judicially reviewable under Administrative Procedure Act to determine whether it was arbitrary or capricious. 5 U.S.C.A. §§ 704, 706.

2. Constitutional Law §=280

United States §=97

Executive Order relating to ownership determinations on inventions made by government employees did not allow taking of employee's property without due process of law where agency determined invention bore direct relation to and was made in consequence of official duties of inventor and inventor was provided with administrative and judicial review of agency determination. U.S.C.A. Const.Amend. 5.

3. Patents §=94

Government was owner of patent on intelligent antiarmor munition invented by government employee, where invention bore direct relation to and was made in consequence of official duties of employee.

Robert W. Heinemann, Dover, N.J., pro se.

Richard J. McGrath, Commercial Litigation Branch, Dept. of Justice, Washington, D.C., argued for appellee. With him on brief were Richard K. Willard, Asst. Atty. Gen. and Vito J. DiPietro, Director.

Before FRIEDMAN, Circuit Judge, NICHOLS, Senior Circuit Judge, and SMITH, Circuit Judge.

EDWARD S. SMITH, Circuit Judge.

This is an appeal by Robert W. Heinemann (Heinemann), pro se, from summary judgment by the United States Claims Court (Claims Court) dismissing Heinemann's claim of patent infringement and holding that the United States is the owner of patent No. 4,050,381 ('381 patent) on an

APPENDIX—Continued

The *Adams* case discusses the meaning of the term "interest" in the context of 11 U.S.C. § 541(a)(1), not in the context of 11 U.S.C. § 522. In fact, the *Adams* case shows that the term "interest," as used in the Bankruptcy Code, 11 U.S.C. §§ 101 *et seq.*, includes a variety of interests. ("Here, both Bank and Trustee have respective intangible 'interests.'" 13 B.R. at 282.) 11 U.S.C. § 541(a)(1) specifically refers to "all legal or equitable interests of the debtor in property as of the commencement of the case." This court must reject the appellant's narrow interpretation of the phrase "debtor's interest." The word "interest" is a broad term encompassing many rights of a party, tangible, intangible, legal and equitable, and the court will not redefine the term to reach the result sought by the appellant.

[3] The appellant also argues that this court should find in its favor on the basis of the reasoning in *Matter of McManus*, 681 F.2d 833 (5th Cir.1982). In that case a Fifth Circuit panel held that 11 U.S.C. § 522(f) would not permit a Louisiana debtor to avoid a chattel mortgage on household goods and furnishings because Louisiana "opted out" of the exemption for such goods and furnishings subject to chattel mortgages. *Id.* at 357. *Matter of McManus* is inapposite because Louisiana, unlike Georgia, enacted a specific provision to avoid the effects of subsection 522(f) in addition to "opting out" of 11 U.S.C. § 522(d).

Notwithstanding the provisions of R.S. 13-3881(2) and (4) to the contrary, a person who has granted a chattel mortgage on his property described in R.S. 13-3881(2) or (4) may not thereafter claim an exemption from the seizure of such mortgaged property for the enforcement of that mortgage.

LSA-R.S. 13-3885 (emphasis added). Even if the Georgia legislature had enacted such a provision this court might have chosen not to follow the *McManus* case. Judge Dyer, an Eleventh Circuit Judge sitting on the

McManus panel by designation, dissented from the majority opinion. This court finds persuasive Judge Dyer's argument that the federal statute does not permit a state to "opt out" of the lien avoidance provisions of § 522(f). "And under the supremacy clause, United States Constitution, art. VI, cl. 2, any conflict between the state lien conservation provision and the federal lien avoidance provision must be constitutionally resolved in favor of federal law." *Id.* at 358.

Accordingly, the order of the bankruptcy court is affirmed.

IT IS SO ORDERED this 16th day of February, 1983.

/s/William C. O'Kelley
WILLIAM C. O'KELLEY

United States District Judge



STRATOFLEX, INC., Appellee,

v.

AEROQUIP CORPORATION, Appellant.

Appeal No. 83-587.

United States Court of Appeals,
Federal Circuit.

July 25, 1983.

Action was brought for judgment declaring invalid and noninfringed a patent for tubing used in the aircraft and missile industry to convey pressurized fuel, lubricants, and other fluids. The United States

STRATOFLEX, INC. v. AEROQUIP CORP.

Cite as 713 F.2d 1530 (1983)

1531

District Court for the Eastern District of Michigan, 561 F.Supp. 618, Patricia J. Boyle, J., declared certain claims of the patent invalid and not infringed, and appeal was taken. The Court of Appeals for the Federal Circuit, Markey, Chief Judge, held that the evidence was sufficient to sustain the finding that claims Nos. 1, 3, 4, 6 and 7 of patent No. 3,473,087 for the tubing were invalid for obviousness.

Affirmed.

Don K. Harness, and Richard A. Walker, Birmingham, Mich., of counsel for appellant. With them on the brief was Jerry K. Harness, Jackson, Mich.

William A. Marshall, Chicago, Ill., argued for appellee. With him on the brief was Donald J. Brott, Chicago, Ill.

1. Patents ¶312(1½)
Party asserting invalidity of a patent not only has procedural burden of proceeding first and establishing a prima facie case, but burden of persuasion on the merits remains with that party until final decision; party supporting validity has no initial burden to prove validity, having been given procedural advantage requiring that he come forward only after a prima facie case of invalidity has been made. 35 U.S.C.A. § 282.

Before MARKEY, Chief Judge, and DAVIS and BALDWIN, Circuit Judges.

MARKEY, Chief Judge.

Appeal from a judgment of the District Court for the Eastern District of Michigan, 561 F.Supp. 618, declaring Claims 1, 3, 4, 6, and 7 of U.S. Patent No. 3,473,087 to Winston Slade ('087 patent) invalid and not infringed. We affirm.

When Stratoflex filed suit seeking a declaration of invalidity and non-infringement of the '087 patent, Aeroquip, as assignee, counterclaimed for infringement of claims 1, 3, 4, 6, and 7. After a non-jury trial, Judge Boyle declared those claims invalid and found them not infringed.¹

II. Background

A. The Technology

Stratoflex and Aeroquip manufacture electrically conductive polytetrafluoroethylene (PTFE)² tubing used in the aircraft and missile industry to convey pressurized fuel, lubricants, and other fluids.

PTFE has replaced organic and synthetic rubbers and plastic in fuel hoses because it has a number of superior characteristics.

2. The parties refer to polytetrafluoroethylene also as "Teflon," a registered trademark of the E.I. DuPont de Nemours Company.

3. Patents ¶36(1)

Nexus is required between merits of a claimed invention and the evidence offered if that evidence is to be given substantial weight en route to conclusion on the obviousness issue. 35 U.S.C.A. § 103.

4. Patents ¶312(5)

Evidence sustained finding that claims Nos. 1, 3, 4, 6, and 7 of patent No. 3,473,087

1. Though Stratoflex filed for a declaratory judgment that the patent was invalid, trial, judgment, and the briefs on appeal dealt only with claims 1, 3, 4, 6, and 7. Accordingly, we make no holding respecting validity of claims 2, 5, and 8-19.

Though pure PTFE is dielectric (non-conductive), it can be made with fillers to make it conductive, though the "filled" tubing is more susceptible to leakage when voids form between the PTFE and filler particles.

B. The Invention

The Slade invention relates to a composite PTFE tubing, formed of an inner layer of electrically conductive PTFE having particles such as carbon black uniformly distributed in it and an outer layer of essentially pure non-conductive PTFE. Claims 1 and 7 are representative:

1. A tubular extrudate formed of attached concentric tubular extrusions, the inner tubular extrusion comprising associated particles of unsintered tetrafluoroethylene polymer and pulverulent, inert, electrically conductive particles, and the outer tubular extrusion comprising associated particles of unsintered tetrafluoroethylene polymer.

7. A tube of polytetrafluoroethylene and the like for conducting fluids under pressure and including means for discharge of internal static electricity to the ends of the tube and grounding the same from the tube interior at said ends in order to maintain the polytetrafluoroethylene tubing performance characteristics, said tubing having an integral polytetrafluoroethylene wall structure with an interior liner portion of a substantially annular conformation from end to end and having a uniform dispersion of electrically conductive particles embedded therein, the major portion of said tubing wall completely surrounding said liner portion exteriorly and being relatively nonconductive in character, said surrounding portion together with said liner containing fluid under pressures uniformly within said tubing.

Claims 3, 4, and 6 are similar to claim 1, but specify various percentages of ingredients.

The particles in the inner layer of the claimed tubing dissipate electrostatic

charges built up on the inner surface of the tubing, conducting them lengthwise of the tubing to grounded metal fittings at the ends of a hose assembly of which the tubing is part, to prevent arcing or discharging through the tubing wall to the surrounding metal braid. Arcing causes "pin holes" through which fuel can leak. The outer layer is coextruded or bonded around the inner layer to contain any fuel leaking through the inner layer. The composite tubing has excellent conductivity, while retaining the desirable characteristics of PTFE tubing.

C. Events Leading to the '087 Patent

Pure PTFE tubing had been used successfully in aircraft engines since at least 1956. In 1959, with the introduction of hydrocarbon jet fuels, leaks were noticed. Aeroquip assigned two staff engineers, Abbey and Upham, to determine the cause. They found the problem to be the arcing of electrostatic charges through the wall of the pure dielectric PTFE tubing to create "pin holes" as described above.

Abbey and Upham found the "pin hole" phenomenon exhibited by all three types of PTFE (White-Titeflex; Pink/Rad-Aeroquip; Black-Goodrich) used in aircraft engines. The black tubing appeared superior because the carbon black it contained gave it an intermittent conductivity. The carbon black took the form of discontinuous strings and arcing across the spaces between string ends conveyed charges to the ends of the tubing. Electrical erosion of the strings, however, widened the spaces, destroying conductivity and leading to the "pin hole" phenomenon. Abbey and Upham concluded that susceptibility of PTFE tubing to "pin holing" was proportional to its conductivity, and that carbon black increased the conductivity of PTFE tubing.

In early 1960, having determined the cause of leaking, Aeroquip approached Raybestos-Manhattan (Raybestos), a PTFE hose manufacturer, for a solution. Aeroquip later purchased the hose section of Raybestos, obtaining the Slade patent by mesne assignment.

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outer layer includes a small amount of carbon black to color the tubing and to aid extrusion.

On December 8, 1978, Aeroquip charged that Stratoflex's unauthorized manufacture and sale of "124" and "127" tubing infringed its rights under the '087 patent.

E. Trial and Opinion

Trial was held on December 15, 16, 18, 19 and 22, 1980. Stratoflex alleged that the '087 patent was invalid as anticipated under 35 U.S.C. § 102, as having been in public use or on sale, 35 U.S.C. § 102(b); for obviousness, 35 U.S.C. § 103; or because the claims were indefinite, 35 U.S.C. § 112. Judge Boyle decided the validity issue on 35 U.S.C. § 103, and the appeal concerns only that Section.

On August 16, 1982, Judge Boyle issued judgment and an accompanying opinion. In that opinion, Judge Boyle indicated: That the presumption of validity is weakened when the challenger introduces pertinent prior art not considered by the examiner; that Aeroquip was therefore not entitled to the presumption's full benefit; that the relevant prior art included rubber hose; that one of ordinary skill in the art had a degree in chemical engineering or its equivalent and substantial experience in the extrusion art; that the prior art taught addition of conductive carbon black to tubing to dissipate electrostatic charges on its inner surface; that composite tubing incorporating various materials in each layer to yield superior products was known; that addition of carbon black to PTFE to induce conductivity was known; that the only differences between the claims and the prior art were use of PTFE in concentric tubes and the "salt and pepper" method of forming the inner tube layer; that secondary considerations were not to be considered because the claimed inventions were clearly obvious and "those matters without invention will not make patentability;" that those matters should be considered only in a close case where they could "tip the balance in favor of patentability;" that it was unnecessary

Raybestos assigned the project to the inventor, Winton Slade, who prepared several samples of conductive PTFE tubing (powdered lead, copper, chemically etched, and carbon black) and sent them for testing to Aeroquip in the summer of 1960. In the Fall, Aeroquip ordered a small production quantity of carbon black tubing. That tubing was not a composite and the carbon black was not uniformly distributed in it.

Slade conceived of the composite tube of the invention as early as August 5, 1960 and reduced it to practice in November of 1961. He filed a patent application on May 22, 1962, with claims directed to the composite tubing and also to various processes for making it.

During prosecution, Slade's assignee Raybestos sought and was denied declaration of an interference with a patent application assigned to Titeflex. The Titeflex application issued as U.S. Patent 3,166,688 ('688 patent). Raybestos then was granted an interference with claims 1 and 2 of the '688 patent. An agreement provided that the loser of the interference would receive a royalty free license. Slade was awarded priority and Titeflex was licensed.

When the examiner imposed a restriction requirement on the Slade application, Slade elected to prosecute the product claims, and filed the process claims in a co-pending application which issued as U.S. Patent No. 3,658,976. Slade's original application issued with its product claims as the '087 patent on October 1, 1969.

D. Stratoflex Actions

From 1962 to 1970, Stratoflex purchased PTFE tubing containing carbon black from B.F. Goodrich. When Goodrich ceased production, Stratoflex purchased conductive PTFE tubing made by Titeflex under its license. Stratoflex then began manufacturing and selling its own "124" and "127" composite tubing having an inner layer with conductive carbon black uniformly dispersed throughout, and an outer layer that is essentially nonconductive, though that

to determine whether synergism was a separate requirement for validity "since either standard justifies a conclusion that the combination of these elements simply lacks 'the unique essence of authentic contribution' to the (PTFE) art which is the heart of invention," that Stratoflex did not infringe claims 1, 3, 4, 6 or 7 because the only non-obvious difference between the claims and the prior art was the "salt and pepper" process for making the tubing layer and Stratoflex did not use that process.

Issues

Whether Judge Boyle erred in: (1) declaring claims 1, 3, 4, 6, and 7 invalid; (2) finding non-infringement.

I. VALIDITY

(A) *Presumption of Validity*

The law, 35 U.S.C. § 282, provides:

A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though defendant upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity.

[1] See, also, *Solder Removal Co. v. USITC*, 582 F.2d 628, 65 CCPA 120, 199 USPQ 129, 133 (CCPA, 1978). The presumption, like all legal presumptions, is a procedural device, not substantive law. It does require the decisionmaker to employ a decisional approach that starts with acceptance of the patent claims as valid and that looks to the challenger for proof of the contrary. Thus the party asserting invalid-

3. If that burden is not carried, the trial court need only so state. It is not necessary to hold "valid" a patent that on another record may be shown to have been invalid. If the burden imposed by § 282 is carried, the patent should be declared invalid.

ity not only has the procedural burden of proceeding first and establishing a prima facie case, but the burden of persuasion on the merits remains with that party until final decision. The party supporting validity has no initial burden to prove validity, having been given a procedural advantage requiring that he come forward only after a prima facie case of invalidity has been made. With all the evidence in, the trial court must determine whether the party on which the statute imposes the burden of persuasion has carried that burden.³

Introduction of more pertinent prior art than that considered by the examiner does not, therefore, "weaken" or "destroy" the presumption. Nor does such introduction "shift" the basic burden of persuasion. The presumption continues its procedural, burden-assigning role throughout the trial. Such introduction can, of course, facilitate the validity challenger's carrying of that burden. It would require one supporting validity to come forward with countervailing evidence, as would the introduction of any evidence tending to establish invalidity. In the end, the question is whether *all* the evidence establishes that the validity challenger so carried his burden as to have persuaded the decisionmaker that the patent can no longer be accepted as valid.

The error here, in denying Aeroquip the "benefit" of the presumption, was more rhetorical than substantive, and did not in this case rise to a level requiring reversal. The record does not indicate that Judge Boyle placed a burden of proving validity on Aeroquip. On the contrary, her full and exhaustive consideration of the prior art indicated a careful evaluation of the case made by the burden-bearing Stratoflex. We have, of course, reviewed the record here in light of the burden assigned Stratoflex by 35 U.S.C. § 282.⁴

4. On the infringement issue, the burden is borne throughout by the patent owner (or exclusive licensee).

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(B) *Obviousness*

The declaration that claims 1, 3, 4, 6, and 7 of the '087 patent are invalid was based on a conclusion that the inventions set forth in those claims would have been obvious under 35 U.S.C. § 103, in the light of facts found in the course of following the guidelines set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545 (1966).

Aeroquip contends that error occurred in findings on the scope and content of the prior art, level of ordinary skill, and differences between the prior art and the claimed invention, and in the legal conclusion of obviousness based on those findings.

Judge Boyle said, "[T]he question of obviousness is a mixed question of fact and law requiring factual findings," citing the then-applicable view expressed by the Court of Appeals for the Sixth Circuit. In this court, the obviousness determination is "a legal conclusion based on factual evidence." *Stevenson v. International Trade Commission*, 612 F.2d 546, 67 CCPA 109, 204 USPQ 276 (CCPA 1979). The difference does not affect the outcome on this appeal, because it did not in this case lead to error in either the findings or conclusion.

Under Rule 52(a), Federal Rules of Civil Procedure, our review of the findings underlying the conclusion on obviousness is limited to a determination of whether they were clearly erroneous in light of the entire record.

Scope and Content of the Prior Art

Aeroquip contends that the scope of the relevant prior art excludes rubber hose because PTFE is a unique material, possessing properties that differ significantly from rubber, and that, because the claims are limited to PTFE, the rubber hose art could at most be peripherally relevant as background information.

The scope of the prior art has been defined as that "reasonably pertinent to the particular problem with which the inventor was involved." *In re Wood*, 599 F.2d 1082, 1086, 202 USPQ 171, 174 (Cust. & Pat.App.

1979), see *Weather Engineering Corp. of America v. United States*, 614 F.2d 281, 222 Ct.Cl. 322, 204 USPQ 41 (Ct.Cl.1980). The problem confronting Slade was preventing electrostatic buildup in PTFE tubing caused by hydrocarbon fuel flow while precluding leakage of fuel. None of the unique properties of PTFE would change the nature of that problem. Nor would anything of record indicate that one skilled in the art would not include the rubber hose art in his search for a solution to that problem.

Indeed, Slade himself referred to a standard textbook on conductive carbon black in rubber when he began his search for a solution. Judge Boyle correctly found Slade's act an acknowledgement by the problem solver of what he considered relevant prior art.

The examiner cited two prior art references in the rubber hose art, one disclosing the problem of electrostatic buildup caused by fuel flow. The Abbey-Upham report, though concerned with PTFE, included a conductivity comparison with carbon black filled rubber hose, and its bibliography listed several articles on electrostatic buildup in rubber. The record reflects that PTFE and rubber are used by the same hose manufacturers to make hoses and that the same and similar problems have been experienced with both. There is no basis for finding that a solution found for a problem experienced with one material would not be looked to when facing a problem with the other. The finding that the rubber hose art is relevant and thus within the scope of the art was not clearly erroneous.

The content of the prior art included the Abbey-Upham Report and several patents relating to conductive and composite rubber hose and to PTFE tubing.

The Abbey-Upham Report, as above indicated, discloses the cause of PTFE tubing "pin holes" as the arcing of electrostatic charges laterally through the non-conductive PTFE tubing wall to the surrounding metal braid, that carbon black increases conductivity of PTFE, and that susceptibility of PTFE tubing to "pinholing" is directly proportional to its conductivity. Judge

Boyle correctly found the report to have disclosed the basic concepts underlying the claimed invention, but not that of forming PTFE tubing as a composite having a conductive inner layer and a nonconductive outer layer.

United States Patent No. 2,341,360 ('360 patent) teaches composite tubing having carbon black in one layer to make it electrically conductive for dissipation of static electricity.

U.S. Patent No. 2,632,205 ('205 patent) teaches a rubber or plastic composite tubing for conveying fluids and having powdered metal or other conductive materials embedded along the inner wall to conduct electric charges lengthwise of the tubing.

U.S. Patent No. 3,070,132 teaches extrusion of carbon black mixed with plastic to form a continuous conductive stripe in a normally dielectric tubing to prevent accumulation of electrostatic charges. It teaches that electrostatic discharge causes leaks through the wall of the tubing and explosions when inflammable materials are conveyed. It mentions rubber tubing.

U.S. Patent No. 2,108,759 discloses an "antistatic" fuel nozzle. It teaches dissipation of electrostatic charges caused by hydrocarbon fuel flow, before those charges can arc, by employing conductive materials like synthetic rubber in an inner layer of the nozzle.

U.S. Patent No. 2,781,288 ('288 patent) teaches a composite rubber hose with each layer arranged to take advantage of its particular properties. It suggests carbon black as a filler, but not as a conductor.

U.S. Patent No. 2,645,249 ('249 patent) and U.S. Patent No. 2,601,690 ('690 patent) teach composite tubing with each layer containing different fillers to impart varying characteristics to the inner and outer layers.

U.S. Patent No. 2,863,174, U.S. Patent No. 2,655,707, and U.S. Patent No. 2,752,637 disclose the use of carbon black as an extrusion aid in forming PTFE.

U.S. Patent No. 2,945,265 ('265 patent) teaches coextrusion of PTFE with different

fillers, carbon black being used as a coloring agent.

Aeroquip's attack on the content-of-the-prior-art findings is limited to its argument that rubber hose should be excluded. That argument having been found wanting, the findings on the content of the prior art cannot be viewed as clearly erroneous.

Consideration of the scope and content of the prior art tilts the scales of decision toward a conclusion of obviousness. Thus the Abbey-Upham report teaches use of carbon black to increase conductivity of PTFE tubing to reduce the chance of electrostatic buildup on the tubing wall. It would appear to have been obvious to one skilled in the art to place the conductive material in the wall where the electrostatic buildup occurs (here the inner wall subjected to electrostatic buildup by fuel flow) as suggested by the '360 and '205 patents. It would appear to have been obvious from the '288, '249, and '690 patents to form a composite tubing with layers arranged to take advantage of their physical and chemical properties. On this record, consideration of the prior art as a whole, and in the absence of evidence that any special problem in following its teachings was created by the unique properties of PTFE, it would appear to have been obvious to place a conductive PTFE layer inside an essentially non-conductive outer PTFE layer to prevent fuel seepage associated with the conductive layer.

Differences Between the Claimed Invention and the Prior Art

Though claim 7 differs substantially from the others, claims 1, 3, 4, 6, and 7 have not been argued separately. They therefore stand or fall together. *In re Bayer*, 568 F.2d 1357, 196 USPQ 670 (Cust. & Pat.App. 1978).

Aeroquip concedes that pure PTFE had been known to be dielectric, that carbon black was known to be conductive, and that PTFE had been made into tubing containing at least a small amount of carbon black. It alleges that the prior art does not show the composite tubing set forth in the claims,

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specifically a composite PTFE tubing with its inner layer formed of uniformly distributed carbon black and PTFE, to provide conductivity sufficient to dissipate electrostatic buildup, and an outer layer of relatively pure PTFE that prevents fuel leakage. It is true that no single reference shows all elements of the claims, but the holding here is one of invalidity for obviousness, not for anticipation. The question, therefore, is whether the inventions set forth in claims 1, 3, 4, 6 and 7, each as a whole, would have been obvious to one of ordinary skill in the art when they were made, in view of the teachings of the prior art as a whole.

Though findings on the "differences" from the prior art are suggested by *Graham v. John Deere*, supra, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious. Consideration of differences, like each of the findings set forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention as a whole would have been obvious.

Judge Boyle found that the differences between the claimed invention and the prior art were use of PTFE in concentric tubes and the "salt and pepper" process of forming the inner layer. The first difference would indicate a mere change of material. The second difference is, of course, irrelevant as stated, the claimed inventions having nothing to do with the process of making the inner layer. The finding may have been meant to indicate that the second difference lay in the structural result of the "salt and pepper" process, namely a uniform dispersion of carbon black particles in the inner layer (a limitation appearing only in claim 7).

With respect to use of a different material, the problem (leakage) and the cause ("pin holes" from electrostatic charges) were known with respect to that material (PTFE). A solution for the electrostatic charge problems, i.e., dissipation of charges lengthwise of the tubing, was known.

Nothing in the first difference found would indicate that it would have been nonobvious to transfer that solution from tubing formed of other materials to tubing formed of PTFE. As above indicated, no special problem needed to be or was overcome in substituting a different material (PTFE) for the materials (rubber and plastics) of the prior art.

Similarly, with respect to uniform dispersion of conductive particles, it was known that spaces between carbon black areas in tubing permit arcing. Nothing of record establishes that use of uniform dispersion to limit or eliminate such spaces would not have been obvious. The same is true respecting use of a nonconductive outer layer to contain leakage from the inner conductive layer.

Aeroquip challenges the finding that the Abbey-Upham report does not teach away from use of carbon black in PTFE tubing, citing this language in the report: "The possibility of establishing continuous longitudinal strings of carbon particles during extrusion, especially in view of the relatively small percentage of carbon black used in Teflon hose seemed remote." It appears between two others in a segment having a thrust quite opposite from that suggested by Aeroquip:

"An explanation of this intermittent conductive behavior required some further investigation. The possibility of establishing continuous longitudinal strings of carbon particles during extrusion, especially in view of the relatively small percentage of carbon black used in Teflon hose seemed remote. If, however, the carbon particle strings were discontinuous, and the individual particles were distributed at varying distances from each other, the intermittent conduction observed in the carbon black filled tubes could be easily understood."

Investigators Abbey and Upham were speculating on the cause of intermittent conductivity in a PTFE tube containing carbon black. They rejected as "remote" the

possibility that in extruding the tubing the carbon formed continuous strings because there was a small percentage of carbon present. That sentence dealt with a process of making the tubing. As subsequently proven in the report, a better explanation was the presence of discontinuous strings in the tubing under investigation.

In the sentence following that cited to us by Aeroquip, the Abbey-Upham report describes uneven spacing between carbon black particles as a possible cause of intermittent conductivity. Far from "teaching away," therefore, the report may be viewed as pointing in the direction of uniform dispersion of such particles, as set forth in claim 7, to produce less intermittent conductivity.⁵

The findings that the differences here were use of a different material and uniform dispersion of carbon black particles were not clearly erroneous. Those differences do not tilt the scales toward a conclusion of nonobviousness of the invention as a whole in light of all prior art teachings summarized above.

Level of Ordinary Skill

The district court found the level of ordinary skill to be that of a chemical engineer or equivalent, having substantial experience in the extrusion arts. Aeroquip says that was too high, suggesting that of an engineer or technician in the PTFE art, as described by its expert, Townsend Beaman. The suggestion is but another effort to limit the prior art to PTFE tubing and avoid inclusion of the art of making fuel hoses of other materials.

The level of ordinary skill may be determined from several factors. *Orthopedic Equipment Company v. United States*, 702 F.2d 1005, 217 USPQ 198 (Fed.Cir.1983) see *Jacobson Brothers Inc. v. United States*, 512 F.2d 1065, 206 Ct.Cl. 518 (Ct.Cl.1975). Slade had the level of skill set by the district

5. Aeroquip's argument that simplicity will not establish obviousness is true but irrelevant.

court. Stratoflex witness Linger was a mechanical engineer with years of experience in the rubber and PTFE hose art. Mr. Beaman was patent counsel for Aeroquip. Judge Boyle correctly viewed Beaman as an observer of, not a worker in, the relevant art.

The statute, 35 U.S.C. § 103, requires that a claim be declared invalid only when the invention set forth in that claim can be said to have been obvious "to one of ordinary skill in the art." (emphasis added) As an aid in determining obviousness, that requirement precludes consideration of whether the invention would have been obvious (as a whole and just before it was made) to the rare genius in the art, or to a judge or other layman after learning all about the invention.

Aeroquip has not shown the finding on the level of ordinary skill in the art to have been erroneous here.

Secondary Considerations

[2] It is jurisprudentially inappropriate to disregard any relevant evidence on any issue in any case, patent cases included. Thus evidence rising out of the so-called "secondary considerations" must always when present be considered en route to a determination of obviousness. *In re Sernaker*, 702 F.2d 989, 217 USPQ 1 (Fed.Cir.1983) citing *In re Felder and Underwood*, 471 F.2d 640, 176 USPQ 300 (Cust. & Pat. App.1973), see *In re Mageli et al.*, 470 F.2d 1380, 1384, 176 USPQ 305, 307 (Cust. & Pat. App.1973) (evidence bearing on issue of nonobviousness "is never of 'no moment', is always to be considered and accorded whatever weight it may have.") Indeed, evidence of secondary considerations may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not. It is to be considered as part of all the evi-

Judge Boyle did not base her obviousness conclusion on simplicity.

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dence, not just when the decisionmaker remains in doubt after reviewing the art.

Judge Boyle made findings on secondary considerations, but said she did not include them in her analysis because she believed the claimed inventions were plainly obvious and "those matters without invention will not make patentability" and should be considered only in a close case. That was error.

Enroute to a conclusion on obviousness, a court must not stop until all pieces of evidence on that issue have been fully considered and each has been given its appropriate weight. Along the way, some pieces will weigh more heavily than others, but decision should be held in abeyance, and doubt maintained, until all the evidence has had its say. The relevant evidence on the obviousness-nonobviousness issue, as the Court said in *Graham*, supra, and as other courts had earlier emphasized, includes evidence on what has now been called "secondary considerations." It is error to exclude that evidence from consideration.

The error may have arisen from the circuity of the slogan oft-cited as a basis for exclusion. In the slogan as here stated: "those matters" is a synonym for "evidence of nonobviousness;" the issue is "nonobviousness" not "invention;"⁶ and "patentability" here is a synonym for "nonobviousness." Thus the slogan reads "evidence of nonobviousness without nonobviousness will not make nonobviousness."

The evidence and findings on secondary considerations being present in the record, the interests of judicial economy dictate its consideration and evaluation on this appeal. The result being unchanged, a remand for reconsideration of the evidence would in this case constitute a waste of resources for the courts and the parties.

[3] A nexus is required between the merits of the claimed invention and the evidence offered, if that evidence is to be given substantial weight enroute to conclu-

sion on the obviousness issue. *Solder Removal Co. v. USITC*, 582 F.2d 628, 637, 65 CCPA 120, 199 USPQ 129, 137 (CCPA 1978) and cases cited therein.

Aeroquip says commercial success is shown because: the "entire industry" makes the tubing claimed in the '087 patent; only Stratoflex is not licensed under the '087 patent; Curtiss-Wright retrofitted 10,000 engines with conductive tubing; and military specifications for conductive tubing are met only by tubing claimed in the '087 patent. We are not persuaded.

Recognition and acceptance of the patent by competitors who take licenses under it to avail themselves of the merits of the invention is evidence of nonobviousness. Here, however, Aeroquip does not delineate the make-up of the "entire industry." The record reflects only two manufacturers, Titeflex and Resistoflex, in addition to the parties. Titeflex has a royalty-free license, resulting from the interference settling agreement described above. Resistoflex has a license that includes several other patents and the right to use the trademark "HI-PAC" for complete hose assemblies. Aeroquip has shown neither a nexus between the merits of the invention and the licenses of record, nor that those licenses arose out of recognition and acceptance of the patent.

No evidence of record establishes that tubing covered by the claims of the '087 patent was used in the Curtiss-Wright retrofit. It cannot therefore be given weight in respect of commercial success.

The military specifications were promulgated after the claimed invention was known. Thus the invention did not meet a longfelt but unfulfilled need expressed in the specifications. Moreover, the record does not support Aeroquip's assertion that the specifications can be met only by tubing covered by the claims of the '087 patent. The nexus required to establish commercial success is therefore not present with respect to the military specifications.

6. See Rich, J., *Laying the Ghost of the "Invention" Requirement*, APLA Quarterly Journal,

Nor is there evidence that others skilled in the art tried and failed to find a solution for the problem. Aeroquip cites Abbey and Upham, but their effort was limited to investigation of the problem and its cause, and was not directed to its solution.

Upon full consideration of the evidence respecting the secondary considerations in this case, and of Aeroquip's arguments, we are persuaded that nonobviousness is not established by that evidence. Judge Boyle's error in refusing to include that evidence in her analysis was therefore in this case harmless.

"Synergism" and "Combination Patents"

Judge Boyle said "synergism" is "a symbolic reminder of what constitutes nonobviousness when a combination patent is at issue," and that under "either standard (*Graham* analysis or synergism) the combination . . . simply lacks the unique essence of authentic contribution to the Teflon art which is the heart of invention."

A requirement for "synergism" or a "synergistic effect" is nowhere found in the statute, 35 U.S.C. When present, for example in a chemical case, synergism may point toward nonobviousness, but its absence has no place in evaluating the evidence on obviousness. The more objective findings suggested in *Graham*, supra, are drawn from the language of the statute and are fully adequate guides for evaluating the evidence relating to compliance with 35 U.S.C. § 103. *Bowser Inc. v. United States*, 388 F.2d 346, 181 Ct.Cl. 834, 156 USPQ 406 (Ct.Cl.1967). Judge Boyle treated synergism as an alternative consideration. Hence the error of its analytical inclusion is harmless in view of Judge Boyle's employment of the *Graham* aids.

The reference to a "combination patent" is equally without support in the statute. There is no warrant for judicial classification of patents, whether into "combination" patents and some other unnamed and undefined class or otherwise. Nor is there war-

rant for differing treatment or consideration of patents based on a judicially devised label. Reference to "combination" patents is, moreover, meaningless. Virtually all patents are "combination patents," if by that label one intends to describe patents having claims to inventions formed of a combination of elements. It is difficult to visualize, at least in the mechanical-structural arts, a "non-combination" invention, i.e., an invention consisting of a single element. Such inventions, if they exist, are rare indeed. Again, however, Judge Boyle's inclusion in her analysis of a reference to the '087 patent as a "combination" patent was harmless in view of her application of *Graham* guidelines.

Similarly, Judge Boyle's reference to "the heart of invention" was here a harmless fall-back to the fruitless search for an inherently amorphous concept that was rendered unnecessary by the statute, 35 U.S.C. The *Graham* analysis here applied properly looked to *patentability*, not to "invention."

[4] We sit to review judgments, not opinions. The analysis reflected in an opinion filed with the judgment appealed from may on occasion be so flawed, however, as to obfuscate the true basis for the judgment or to establish that the judgment was erroneously based. Such might have here been the case if the judgment had not been accompanied by the alternative and proper analysis under *Graham* described above. In light of that alternative analysis, in which we see no error, we affirm the judgment declaring claims 1, 3, 4, 6, and 7 invalid for obviousness.

Infringement

When presented with patent validity and infringement issues, trial courts should, as Judge Boyle did here, decide both. First, the parties, witnesses and exhibits involved in both issues are before the court. If a judgment limited to one issue is reversed, it may become necessary to again call many of the same persons before the court for

Cite as 713 F.2d 1541 (1983)

trial or argument on the other. In any event, a remand would normally be necessary for a return by the trial court to whatever fact finding process may be involved in a determination of the undecided issue. Second, a finding that a claimed invention has or has not been appropriated by the alleged infringer may carry substantial weight in a court's analysis of all the evidence bearing on the obvious-nonobvious issue. An alleged infringer's lauding of all the available prior art may, for example, in some cases have a hollow ring when played against its disregard of that art and its copying of the invention.

The determination of non-infringement here was flawed by an unwarranted reading into the claims of that part of the specification devoted to a description of the "salt and pepper" process of making PTFE tubing. The "salt and pepper" process is set forth in no claim of the '087 patent. It is claimed in the separate patent described above. Whether Stratoflex employs a different process in forming its inner layer is irrelevant, the sole question being whether the accused tubing product of Stratoflex infringes the product claims of the '087 patent.

The error was harmless. Whether on proper analysis the Stratoflex "124" and "127" tubing products may be found to infringe claims 1, 3, 4, 6, and 7 need not be now determined. The claims having been found invalid, the issue has been rendered moot.

Conclusion

The judgment declaring claims 1, 3, 4, 6, and 7 invalid is affirmed.

AFFIRMED.



The UNITED STATES, Appellant,
v.

JOHNSON CONTROLS, INC., Appellee.
Appeal No. 65-82.

United States Court of Appeals,
Federal Circuit.

Aug. 2, 1983.

The United States appealed from a final decision of the Armed Services Board of Contract Appeals which held that it had jurisdiction, under the Contract Disputes Act of 1978, to decide a claim brought directly by a subcontractor, that subcontractor was the proper party to certify claim under the Act, and that subcontractor was entitled to an equitable adjustment for supplying redundant hardware. The Court of Appeals, Federal Circuit, Bennett, Circuit Judge, held that ASBCA erred in assuming jurisdiction over direct appeal by the subcontractor, as subcontractor was not a "contract Disputes Act" as that term is defined in the Contract Disputes Act; not only was there no privity of contract between the Government and the subcontractor arising either from the contract language or from the doctrine of agency, but no direct appeal by the subcontractor was authorized under either the prime contract or subcontract.

Reversed and vacated.

1. United States \Leftarrow 74½

A number of exceptions have been recognized to general rule that a government subcontractor cannot bring a direct appeal against the Government, including the exception which exists where the prime contractor was acting as an agent of the Government. Contract Disputes Act of 1978, §§ 2-15, 3, 7, 10(a)(1), 41 U.S.C.A. §§ 601-613, 602, 606, 609(a)(1).

2. Principal and Agent \Leftarrow 14(1)

United States \Leftarrow 74½

Even assuming that an agency relationship could be implied under the provi-

do we. It appears obvious to us that automobile trucks such as come under item 692.02 transport the driver and often one or more passengers in addition. On the other hand, passenger vehicles which obviously would fit under item 692.10 practically all have trunk space which may be used to carry goods. As between the TSUS items for automobile trucks and other motor vehicles, including passenger cars, the evidence clearly points to classification in the former. The rear cargo space in model 265 obviously is characteristic of a truck, more particularly of the ordinary pickup truck with a single seat in the cab for the driver and one or two passengers. We do not see that the addition of a removable second seat and corresponding rearward enlargement of the cab to permit carrying a larger work crew take the model 265 out of the truck category. Volkswagen's aforementioned pamphlet, exhibit 4, like other VW advertising in evidence, includes both the single-cab pickup and the double-cab pickup as members of "The Volkswagen family of trucks." We therefore hold model 265 to be a "truck."

As to classification of model 265 as a vehicle "specially constructed and equipped to perform special services or functions" under item 692.16, the aforementioned stipulation by Volkswagen's counsel regarding the exemplars therein is of interest, along with the fact that the court below ruled the government's offer of evidence regarding them was irrelevant. But even without these considerations, the nature of the exemplars is so well known that judicial notice can be taken that they all are specially equipped to perform special services or functions other than merely transporting goods or persons from one point to another. They are all provided with

fixed equipment to perform special services or functions. Volkswagen's evidence was all introduced at the first trial where its sole claim was to item 692.10. We find nothing in that evidence which persuades us that model 265 was specially equipped to perform special services or functions in the sense we find indicated by the exemplars in item 692.16. The only thing "special" resides in a redistribution of passenger versus cargo carrying facilities. There is no "special equipment."

The Customs Court considered these exemplars to be "at best directory" and found "nothing in the language of the statute or in its legislative history indicative of a limitation on classification in terms of the degree of special construction and equipment" required. We do not agree with the court's conclusion. In the absence of some restriction on the breadth of the words "specially" and "special" in item 692.16, the mere addition of various available optional equipment or accessories might be considered to bring an otherwise conventional vehicle within the item—a result obviously not intended by Congress.

[2] Thus, we find that Volkswagen has failed to meet its burden of proving the district director's classification incorrect and either of its claimed classifications correct. See *United States v. Good Neighbor Imports, Inc.*, 33 CCPA 91, C.A.D. 321 (1945); *United States v. Loffredo Bros., Gehrig Hoban & Co., Inc.*, 46 CCPA 63, C.A.D. 697 (1958); *United States v. Victoria Gin Co.*, 48 CCPA 33, C.A.D. 759 (1960). The classification in item 945.69 (provided for in item 692.02) must stand.

The judgment of the Customs Court is reversed.

Reversed.

Joseph F. Nakamura, Washington, D. C., for the Commissioner of Patents. Fred W. Sherling, Washington, D. C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Judges.

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled "Responsive Answer System." We reverse.

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in "response areas" meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

PERMANENT MEANINGFUL INFORMATION PLUS REMOVABLE CONFUSING INFORMATION.

A. TRUE
B. FALSE
C. YES
D. NO

A. TRUE
B. FALSE
C. YES
D. NO

FIG. 1A

FIG. 1B

Fig. 1A shows two response areas to a given question before any removing ac-

Application of Stephen F. ROYKA and Robert G. Martin. Patent Appeal No. 9062.

United States Court of Customs and Patent Appeals.

Feb. 7, 1974.

Appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of patent application, Serial No. 648,701, for a "responsive answer system." The Court of Customs and Patent Appeals, Rich, J., held that an answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by an erasure, both being legible so that a student, seeing a choice of answers to a question, was required to make a selection, the correctness of the selection being shown by the information which was then removed by the erasure, was not anticipated by prior patents and was therefore patentable.

Reversed.

Patents 6-66(1,20)

"Responsive answer system," answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by erasure, both being legible so that student, seeing choice of answers to question, was required to make selection, correctness of selection being shown by information which was then removed by erasure, was not anticipated by prior patents and was therefore patentable. 35 U.S.C.A. §§ 102, 103.

Michael H. Shanahan, Rochester, N. Y., of record, for appellant; Thomas M. Webster, Rochester, N. Y., Boris Haskell, Washington, D. C. (Paris, Haskell & Levine), Washington, D. C., of counsel.

tion by the student has taken place and Fig. 1B shows the permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up "YES" or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is "fixed" or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising

a support having response areas for presenting information for selection, permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area, said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine

which information is permanent and which is removable

whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid)	356,695	Jan. 25, 1887
Bernstein et al.	3,055,117	Sep. 25, 1962
(Bernstein)	3,364,857	Jan. 23, 1968
Lein et al. (Lein)		(filed Feb. 2, 1966)

Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. § 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. § 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

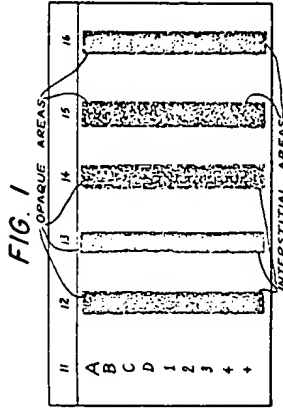
Bernstein discloses an answer sheet in which printed information representing a response is "temporarily concealed from the observer" and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design,

Cite as 490 F.2d 981 (1974)

color and position of the hiding or confusing media.

Fig. 1 of Bernstein's drawings, illustrates some of his concealing means:



The following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optically confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% of the response is actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled "Transformation Picture and Print." The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amuse-

ment and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled "The Effects of Drink"; Scene 3, Mother stands in front of a sign reading "Pawm Shop." Across the bottom of the picture is a legend which says "Wash the above and see what water will do." Fig. 11 shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a cloth-covered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawm Shop sign has vanished. Two new subscriptions appear and the words "The" and "Drink" have disappeared, the resultant being a new picture title reading "The Beneficial Effects of Temperance." "The Beneficial" and "Temperance" were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused toner and the permanence of fully fused toner.

OPINION

As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid

or Bernstein, neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the disclosure of *legible* meaningful and *legible* confusing information simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the *legible* confusing information. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a selection, as called for by claim 28. In appellants' device the *legible* confusing information—i. e., the wrong answers—are *legible* in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part: The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to design physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous removable, confusing information.

Claims are not to be read in a vacuum and while it is true they are to be given

the broadest *reasonable* interpretation during prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms "legible" and "information" on Bernstein's confusion patterns, as did the examiner and the board. They are not "legible," as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief—so far as claim 28 is concerned—is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a "selection" can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour de force. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to "response areas," to the presentation of two categories of information (meaningful permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are

Cite as 490 F.2d 985 (1973)

both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipating the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is reversed.

Reversed.



CHRYSLER CORPORATION, Plaintiff. Appellant, v. John T. DUNLOP, Director Cost of Living Council, et al., Defendants-Appellees.

No. DC-18.
Temporary Emergency Court of Appeals.
Dec. 5, 1973.

In manufacturer's action for declaratory and injunctive relief with respect to order of the Cost of Living Council deferring consideration of the merits of manufacturer's proposed price increase, the United States District Court for the District of Columbia, Barrington D. Parker, J., denied preliminary injunction, and manufacturer appealed. The Temporary Emergency Court of Appeals held that if the order was not supported by substantial evidence, manufacturer would have substantial likelihood of prevailing on the merits, that the trial court should have made findings of fact and conclusions of law on the question of whether the order was supported by substantial evidence, and that the trial court should consider manufacturer's proposal that it would escrow all moneys

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the

As to claim 36, the examiner said it "is merely a printed matter variation of the design of the reference," Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter in *re Jones*, 373 F.2d 1007, 54 CCPA 1218 (1967); and in *re Miller*, 418 F.2d 1392, 57 CCPA 809 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

of the total amount submitted is disallowed.¹⁰ NTEU is thus entitled to recover \$14,283.75 as reasonable attorney fees under the EAJA.¹¹

GRANTED AS MODIFIED.



James W. Geriak, Los Angeles, Cal., argued for appellants. With him on brief was Bradford J. Duft, Los Angeles, Cal. John F. Pitrelli, Arlington, Va., argued for appellee. With him on brief were Joseph F. Nakamura, Sol. and John W. De-whirst, Associate Sol., Washington, D.C.

In re Lucas S. GORDON and Karl M. Sutherland.

Appeal No. 83-1281.
Serial No. 124312.

United States Court of Appeals,
Federal Circuit.

May 10, 1984.

Appeal was taken from a decision of the United States Patent and Trademark Office Board of Appeals affirming an examiner's rejection of appellants' claims one to three and five to seven of application serial No. 124,312 relating to a blood filter assembly. The Court of Appeals, Jack R. Miller, Circuit Judge, held that Board failed to establish a prima facie case of obviousness with regard to the claims in issue. Reversed.

Patents 6-16,17

Patent and Trademark Office Board of Appeals failed to establish a prima facie

10. According to the affidavits submitted by NTEU, Kerry L. Adams spent 13.5 hours on research and drafting of the response to OPM's petition for rehearing, all of which is disallowed. David S. Handsher spent 20.5 hours on research and drafting of NTEU's motion to dismiss (including consideration of OPM's petition for review), one-half of which is disallowed. Both attorneys billed at \$75 per hour.

11. We reject OPM's unsupported contention that 99.5 hours is per se excessive for NTEU's work relating to its principal and supplemental briefs and preparation for oral argument (OPM suggests that 40 hours is "reasonable"). Similarly,

case of obviousness with regard to claims one to three and five to seven of application serial No. 124,312 relating to a blood filter assembly. 35 U.S.C.A. § 103.

Before BENNETT, Circuit Judge, SKELTON, Senior Circuit Judge, and MILLER, Circuit Judge.

JACK R. MILLER, Circuit Judge.

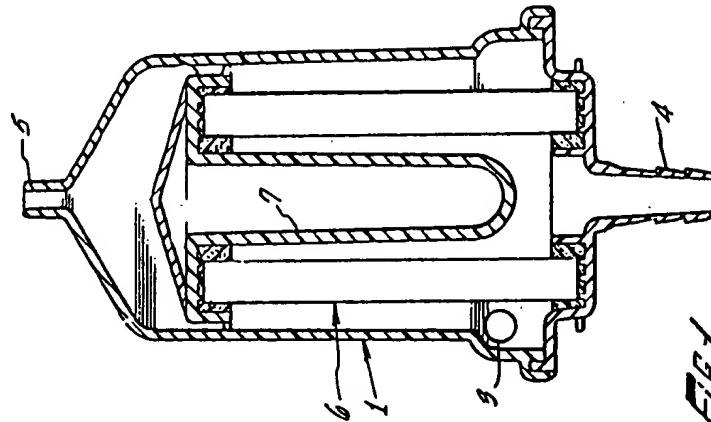
This appeal is from the decision of the United States Patent and Trademark Office ("PTO") Board of Appeals ("board") affirming the examiner's rejection of appellants' claims 1-3 and 5-7 as unpatentable under 35 U.S.C. § 103. We reverse.

THE INVENTION

Appellants claim a "blood filter assembly" used during surgery and other medical procedures involving the handling of blood to remove clots, bone debris, tissue, or other foreign materials from blood before it is returned to a patient's body. Unlike blood filter assemblies widely used in the prior art, the device of the present invention permits both entry of the blood into, and ultimate discharge of the blood out of, the bottom end of the filter assembly, as shown below.³

We reject OPM's contention that some of this work was "duplicative" because two attorneys researched and drafted NTEU's principal brief. We find NTEU's application for fees to be sufficiently detailed, and find that the amount claimed is reasonable under the circumstances of this appeal.

1. In application Serial No. 124,312, filed February 25, 1980, for a "Blood Filter."
2. Extraneous numbers have been removed from this and the subsequent drawing for clarification.

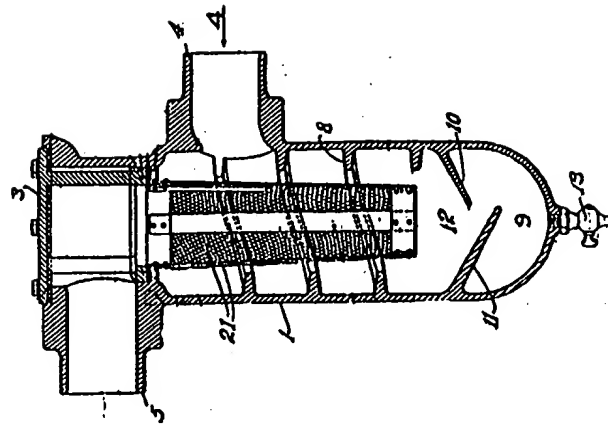


The blood filter assembly comprises a shell 1 provided with blood inlet 3 and blood outlet 4. Between the blood inlet and the blood outlet is filter medium 6 positioned within the filter medium core 7.

The location of blood inlet 3 is such that the incoming blood is directed along a spirally upward path by the inner wall of the shell. Further, the location of the blood inlet at the bottom end of the filter assembly facilitates the removal of gas bubbles by allowing them to rise upwardly out of the blood. The gas bubbles so removed are released from the blood filter assembly by means of a gas vent 5 located in the region of the top end of the assembly.

Independent claim 1, from which the other appealed claims depend, is illustrative: Blood filter assembly comprising:

- a. a shell having a first top end and a second bottom end,
- b. a blood inlet located in the region of said bottom end and opening into said bottom end,



A continuous helical tooth or thread 8 is formed integral with the inner wall of shell 1 and imparts to the incoming liquid a whirling motion, which gives the liquid a scouring action to help clean the surface of a metal screen filter 21 and guides unwanted dirt and water downwardly into a pocket 9 in the bottom of the shell. A pair of shelves 10 and 11, projecting inwardly and downwardly from the inner wall of the shell, further assists the entrance of dirt and water into the pocket 9 and prevents their being drawn back into the main chamber 12. The reference expressly states, "gravity assists in the separation of heavier oils or water." A pet-cock 13, projecting vertically downward from the bottom of the pocket is used to remove the collected dirt and water periodically. The top of the liquid strainer is completely closed by gland 3 except for the inlet and outlet openings.

BOARD OPINION

The board held that the appealed claims were drawn to an apparatus which "would have at least been rendered *prima facie* obvious to one of ordinary skill in the art by the apparatus disclosed in French." The board's reasoning was that it would have been obvious to turn the French device upside down to have both the inlet and outlet at the bottom, rather than at the top; and to employ French's "pet-cock" as the claimed "gas vent." In the board's opinion, no patentable distinction was created by viewing French's apparatus from one direction and the claimed apparatus from another.

ANALYSIS

We are persuaded that the board erred in its conclusion of *prima facie* obviousness. The question is not whether a patentable distinction is created by viewing a prior art apparatus from one direction and a claimed apparatus from another, but, rather, whether it would have been obvious from a fair reading of the prior art reference as a

3. Because our holding that the PTO has failed to establish a *prima facie* case is dispositive, it is unnecessary to reach other arguments raised by appellants.

whole to turn the prior art apparatus upside down. French teaches a liquid strainer which relies, at least in part, upon the assistance of gravity to separate undesired dirt and water from gasoline and other light oils. Therefore, it is not seen that French would have provided any motivation to one of ordinary skill in the art to employ the French apparatus in an upside down orientation. The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. See *Carl Schenck, A.G. v. Nortron Corp.*, 713 F.2d 782, 787, 218 USPQ 698, 702 (Fed.Cir.1983), and *In re Sernaker*, 702 F.2d 989, 995-96, 217 USPQ 1, 6-7 (Fed.Cir.1983), both citing *In re Imperato*, 486 F.2d 585, 587, 179 USPQ 730, 732 (CCPA 1973).

Indeed, if the French apparatus were turned upside down, it would be rendered inoperable for its intended purpose. The gasoline to be filtered would be trapped in pocket 9, and the water French seeks to separate would flow freely out of the outlet 5. Further, unwanted dirt would build up in the space between the wall of shell 1 and screen 21, so that, in time, screen 21 would become clogged unless a drain valve, such as pet-cock 13, were re-introduced at the new "bottom" of the apparatus. See *In re Schulpen*, 390 F.2d 1009, 1013, 157 USPQ 52, 55 (CCPA 1968). In effect, French teaches away from the board's proposed modification.

Because the PTO has failed to establish a *prima facie* case of obviousness, the rejection of claims 1-8 and 5-7 as unpatentable under 35 U.S.C. § 103 must be reversed.*

REVERSED.



UNITED STATES COURT OF APPEALS

Fifth Circuit

DECISIONS WITHOUT PUBLISHED OPINIONS

The following cases have been decided without formal opinion prepared for publication in the permanent law reports:

Title	Docket Number	Date of Decision	Disposition	Appeal from and Citation (if reported)
*Jones v. City of Lubbock	83-1502	4/30/84	AFFIRMED IN PART	N.D.Tex.
*Wilkerson v. State of Tex.	83-1640	4/30/84	AFFIRMED	N.D.Tex.
*Hollis v. St. Louis S.W. Ry. Co.	83-2666	4/30/84	AFFIRMED	E.D.Tex.
*Underwood v. Maggio	83-3341	4/30/84	REVERSED	M.D.La.
*Wells v. Heckler	83-4520	4/30/84	AFFIRMED	S.D.Miss.
*Aetna Cas. v. O'Mire	83-4577	4/30/84	AFFIRMED	S.D.Miss.
*Grubbs v. Am. Mfrs. Mut. Ins.	83-4638	4/30/84	AFFIRMED	W.D.La.
*Lee v. Heckler	83-4742	4/30/84	REHEARING GRANTED; 729 F.2d 778 REVERSED	S.D.Miss.
*Falgout v. U.S. Marshals Service	82-2190	5/1/84	AFFIRMED	S.D.Tex., 539 F.Supp. 182
U.S. v. Terrones	83-1708	5/2/84	AFFIRMED	W.D.Tex.
*Trower v. Maple	83-2686	5/4/84	AFFIRMED	S.D.Tex.
*Chase v. Phelps	83-3567	5/4/84	AFFIRMED	M.D.La.
*Cactus Intern. v. Price	83-4325	5/4/84	AFFIRMED	Ben.Rev.Bd.
*Offshore Co. v. Meyers	83-4604	5/4/84	AFFIRMED	Ben.Rev.Bd.
*Freeze v. Savoie	84-4052	5/4/84	VACATED	W.D.La.
*Grieg v. Campsey	83-1801	5/7/84	DISMISSED	W.D.Tex.
*Seals v. U.S.	83-3263	5/7/84	AFFIRMED	E.D.La.
*Brown v. Mississippi Parole Bd.	83-4517	5/7/84	AFFIRMED IN PART	N.D.Miss.
*Walker v. Southern Pacific Transp.	83-4675	5/7/84	AFFIRMED	W.D.La.
*Preston v. McKaskle	84-2108	5/7/84	VACATED	S.D.Tex.
*Flowers v. Diamond Shamrock Corp.	83-1883	5/8/84	AFFIRMED	N.D.Tex.
*Ford v. Marsh	83-1564	5/9/84	AFFIRMED	W.D.Tex.

* Fed.R.App.P. 34(a); 5th Cir.R. 34.2.

† Local Rule 47.6 case.

40 CCPA

Application of Ferdinand J. RATTL

Patent Appeal No. 6452.

United States Court of Customs
and Patent Appeals.

Sept. 30, 1959.

The Board of Appeals of the United States Patent Office affirmed rejection by Primary Examiner of claims 1, 4, 7 and 10 of application, Serial No. 359,325, for a patent for an oil seal for sealing the space between a bore in a housing and a relatively movable shaft centrally located in the bore, and the applicant appealed. The Court of Customs and Patent Appeals, Smith, Judge, reversed the rejections of claims 1, 4, 7 and 10.

Reversed.

Kirkpatrick, District Judge, and Worley, Chief Judge, dissented.

Patents §113(8)

On appeal from decision of Board of Appeals of the United States Patent Office affirming rejection by Primary Examiner of certain claims of application for patent for an oil seal for sealing space between a bore in a housing and a relatively movable shaft centrally located in the bore, rejections of the claims were reversed by Court of Customs and Patent Appeals.

Cromwell, Greist & Warden, Chicago, Ill. (Raymond L. Greist, Chicago, Ill., of counsel), for appellant.

Clarence W. Moore, Washington, D. C. (S. Wm. Cochran, Washington, D. C., of counsel), for Commissioner of Patents.

Before WORLEY, Chief Judge, RICH, MARTIN, and SMITH, Judges, and Judge WILLIAM H. KIRKPATRICK.*

SMITH, Judge.

This is an appeal from the decision of the Board of Appeals of the United States

* United States Senior District Judge for the Eastern District of Pennsylvania, designated to participate in place of Judge

Patent Office affirming the rejection by the Primary Examiner of claims 1, 4, 7 and 10 of appellant's application serial No. 359,325, filed June 3, 1953, for a patent on an "Oil Seal" for sealing the space between a bore in a housing and a relatively movable shaft centrally located in the bore.

Claim 1 is representative of claims 4 and 7 and reads:

"1. A seal for insertion in a cylindrical bore in a housing about a relatively movable centrally located shaft, comprising an annular bore-engaging mounting portion of resiliently deformable material for endwise insertion in and statically sealed engagement with the bore in the housing, an annular shaft-engaging portion connected with said bore-engaging portion for running engagement with the shaft, and a metal ring located adjacent one end of said bore-engaging portion, said ring being provided with a plurality of axially extending outwardly biased spring fingers in outwardly clamped engagement with said bore-engaging portion inwardly of the outer periphery of the latter, and said ring being also provided outwardly of said bore-engaging portion with means for detachably connecting the ring to the housing outwardly of the bore in the latter." (Emphasis ours.)

Claim 10 differs from the other claims on appeal and reads:

"10. A seal for insertion in a cylindrical bore in a housing about a relatively movable centrally located shaft, comprising a sealing ring having an outer bore-engaging portion of resiliently deformable material, which portion is of somewhat larger diameter than the bore in the housing, for press-fit insertion in the bore, and a metal retaining ring associated with the sealing ring, said retaining ring being connected with

O'Connell, pursuant to the provisions of Title 28 United States Code, Section 204(d).

the sealing ring and being provided outwardly of the latter *with resiliently yieldable hook formations which are adapted to be sprung into interlocking engagement with a complementary formation associated*

with the housing outwardly of the bore, which engagement acts to prevent axial displacement of the sealing ring relative to the bore in the housing." (Emphasis ours.)

The references in the case are:

Roth	1,546,942	July 21, 1925.
Norton	1,951,034	Mar. 1, 1934.
Jepson	2,544,324	Mar. 6, 1951.
Chinnery et al. (British)	578,526	July 2, 1946.

Appellant's shaft seal comprises an annular sealing member of resilient deformable material which is adapted to be inserted into a cylindrical bore surrounding a relatively movable shaft. The inner portion of the sealing member is provided with a flexible lip which is held in engagement with the shaft by a garter spring. In the outer portion of the sealing member, an annular slot is provided which is concentric with and spaced from the outer periphery of the sealing member. This slot extends axially from the end of the member and provides a pocket in which the axially extending outwardly biased spring fingers of a metallic attaching ring are located. This construction permits the spring fingers to exert a force on the resilient material in the direction of the annular wall of the bore to provide and maintain a snug engagement between the outer surface of the resilient member and the inner surface of the bore. The metallic attaching ring is also provided with radially extending resilient hooks located outwardly of the bore engaging portion of the resilient member. The housing is provided with a complementary formation outwardly of the bore which is engaged by the resilient hooks to provide a snap-on connection between the bore and the seal.

The Roth and Norton patents were relied upon by the examiner in rejecting claim 10, and since both references were considered by the board, we have included them in our consideration of this case. Roth shows a gasket structure for steam train line hose couplings. Norton shows

an adjustable repair clamp for bell and spigot joints in which there is provided a sheet metal bridge piece "preferably of spring material." The bridge piece is sprung into interlocking engagement with a structural portion of the clamp and exerts its force on a resilient packing ring which, if desired, may be cemented to it.

The Chinnery et al. patent is the reference principally relied upon by the Patent Office. It shows a housing provided with a bore surrounding a centrally located shaft. A reinforced and "stiffened" sealing member formed of a material such as rubber, is press fitted into the space between the bore and the shaft. The sealing member has an inner lip held in contact with the shaft by a garter spring. The bore engaging portion of the sealing member is "stiffened" by an axially extending cylindrical sheet metal casing which acts as a reinforcing member for a definite purpose which is described by Chinnery et al. as follows:

"Owing to the limited radial space within which the oil seal is to be accommodated, the holding portion of the oil seal cannot be stiffened by being massive. Consequently the holding portion of the present oil seal is stiffened in the known manner by a reinforcement, which may either encase or line, or alternatively constitute, such holding portion and therefore makes the press-fitting contact with the machine part stationary relatively thereto, or may be an internal reinforcement in the

sense that it does not make press-fitting contact with the machine part stationary relatively thereto." (Emphasis ours.)

In Fig. 8 Chinnery et al. shows a radially extending flange at the outer edge of a reinforcing member of the internal reinforcement type which flange extends beyond the sealing member "to such an extent as to serve as a means of attachment of the oil seal to the housing *i*, additional to the interference press fit of the holding portion *a* in the housing recess *g*." The aforesaid flange is shown attached to the housing by screws or bolts.

The Jepson patent relates to a gasket for sealing the space between the upper and lower vessels of a vacuum-type coffee maker. The gasket is an annular rubber member attached to the lower part of the upper vessel and is designed to fit into the upper part of the lower one. Located in a groove in the gasket is a sleeve member provided with axially and downwardly extending spring fingers which are so biased radially as to urge the lower peripheral portion of the gasket outwardly, thus effecting a tight engagement with the mouth of the lower vessel.

Claims 1, 4, and 7 stand rejected on Chinnery et al. in view of Jepson, on the ground that it would not require "invention" to replace the cylindrical sheet metal reinforcing member, which is secured to the Chinnery et al. sealing member, by an annular set of outwardly biased spring fingers shown by Jepson.

The problems which were solved by appellant's invention existed in this art at the time of his invention despite the Chinnery et al. disclosures. It was appellant rather than Chinnery et al. who provided the art with a shaft seal in which the resilient element of the seal could be readily inserted into a bore in the housing so that it could be removed from the bore and replaced by a new sealing element without mutilation of the sealing surface of the bore. This is particularly important, the specification points out, where the bore is formed in light metal alloys such as are used in aircraft engines and which are relatively

soft and easily damaged. In appellant's oil seal, the resilient seal is so constructed that when mounted in the bore, it will establish and maintain a fluid tight relationship between the outer peripheral surface of the resilient seal member and the inside of the bore. Where either natural or synthetic rubber is used as the resilient sealing member in such seals, the rubber in time will take a set or lose its resiliency at least to the extent that the seals soon become ineffective to prevent leakage of oil. When subjected to mechanical pressures and heat, such a rubber sealing element loses its sealing effectiveness at an accelerated rate. The problems in the oil sealing art arising from such use of resilient sealing elements appear to have persisted because of the failure of the art to recognize these characteristics of the rubber sealing element and to so design the resilient element and the mounting therefor as to assure holding the outer circumference of the resilient sealing element in static oil-sealing contact with the inner circumference of the bore in which it is inserted.

Appellant's seal differs from the art of record in at least three respects:

(1) The provision of the annular slot which extends axially inward from one end of the resilient sealing element. This feature is claimed as part of the combination set forth in claim 4.

(2) The outwardly biased resilient spring means or fingers inserted in the resilient sealing element. These means are claimed as part of the combination of claims 1, 4 and 7.

(3) The "snap-on" connector which holds the resilient sealing element and engages with a complementary formation associated with the housing outwardly of the bore. This feature is in the combination of claim 10.

The patents cited by the examiner, either alone or in combination, do not disclose a resilient shaft sealing element having these features.

It is common knowledge that resilient deformable materials such as either natural or synthetic rubber are incompressible.

sible, that is, while they may be deformed, this can occur only if the design and mounting of the part permits the resilient material to change its shape in response to the applied forces.

The seal construction disclosed in Chinnery et al. is such that the "interference press fit" which that patent calls for is alone relied on to keep the seal tight. There is nothing in the Chinnery et al. patent to show how the resilient sealing element is *maintained* in resilient contact with the bore otherwise than by the resiliency of the rubber. If and when that resiliency is lost, the sealing effect will be impaired.

Considering the incompressible nature of the rubber in the sealing element disclosed in Chinnery et al., its stiffening and reinforcement by the cylindrical sheet metal member, and its "interference press fit" in the bore, it seems clear to us that the Chinnery et al. seal cannot function in the manner of appellant's seal. Now, as to the contention that Jepson would suggest inserting a set of spring fingers, the resilient element of Chinnery et al. is forced so tightly into the bore and is so "stiffened" that the use of the resilient spring fingers of Jepson could not possibly increase the resilient deformation of the Chinnery et al. seal in the direction of the bore or increase the sealing engagement of the seal with the bore. The teaching of the Chinnery et al. patent points away from the addition of any spring element. On the other hand, we find nothing in the disclosure of Jepson's coffee maker gasket to suggest that any part of it has applicability to shaft seals. The two arts are at least somewhat remote from each other even if they both involve sealing.

We, therefore, find that Chinnery et al. did not teach the shaft sealing art how to solve the problems which existed in that art at the time of appellant's invention. We hold, further, that the combination of Jepson with Chinnery et al. is not a proper ground for rejection of the claims here on appeal. This suggested combination of references would require a substantial reconstruction and redesign of

the elements shown in Chinnery et al. as well as a change in the basic principles under which the Chinnery et al. construction was designed to operate.

Once appellant had taught how this could be done, the redesign may, by hindsight, seem to be obvious to one having ordinary skills in the shaft sealing art. However, when viewed as of the time appellant's invention was made, and without the benefit of appellant's disclosure, we find nothing in the art of record which suggests appellant's novel oil seal as defined in claims 1, 4 and 7.

We shall now consider the rejection of claim 10, remarking first that it differs from claims 1, 4 and 7 in that it is directed to a combination of a housing bore, a resilient sealing ring and a metal retaining ring connected to the sealing ring, wherein the metal ring has *resilient hooks* which secure the seal in the bore. This claim is not limited to the outwardly biased spring fingers.

The examiner rejected claim 10 on two grounds: (1) that substitution for the screw securing means of Chinnery et al. of a series of spring hooks such as disclosed by Norton would not involve patentable invention, and (2) unpatentability over Roth.

We shall first dispose of the second rejection. The board held that claim 10 is drawn to a combination of a sealing ring and a housing bore in which the sealing ring is detachably placed and that Roth discloses nothing of this nature. The board therefore reversed the rejection on Roth and consequently it is not before us.

As to the first rejection, the board recognized that it was on the ground of unpatentability "over Chinnery et al. in view of Norton" and pointed out that the examiner could see nothing patentable in substituting spring hook attaching means shown in Norton for the screws of Chinnery et al. It then said:

"Appellant argues that the references fail to suggest or teach how the proposed [claimed] combination could be made and after a careful consideration of the references, we

*have concluded that he is correct in this respect. We therefore concede that the claim * * * defines novelty over the disclosure of Fig. 8 of Chinnery et al. Novelty alone however, is no proper basis for the allowance of a claim.*" (Emphasis ours.)

Although, in reaching this conclusion, the board made no reference to Norton, the context compels the conclusion that novelty was found notwithstanding the disclosure of Norton, taken together with Chinnery et al. We fully agree, of course, with the board's statement that novelty alone is not enough for patentability.

With the next statement of the board, in explanation of its affirmance of the rejection of claim 10, we do not agree. It reads:

"In order to properly define invention [meaning, of course, patentable invention], a claim should clearly define a structure *which possesses some definite advantage over the prior art.* As far as we can determine there is no better combination of housing and seal produced by using a series of snap fastener connections to connect the seal to the housing, as in appellant's structure, over using a series of bolts, as in the structure shown by Chinnery et al. Both act to merely detachably connect one element to another element and as far as we can find are merely equivalent connecting means especially in the absence of any unexpected result or advantage being obtained, by using

one means in preference to the other, on which the record before us is entirely silent." (Emphasis ours.)

If we may extract from the foregoing what we understand to be the essence of the board's position in the matter, it is that claim 10 is not patentable, though it defines a combination which is novel over the disclosures of the references, because the claimed combination has not been shown to be any better than, or to possess any advantage over, what was known to the art.

As was pointed out in *In re Stempel, Jr.*, 241 F.2d 755, 44 CCPA 820, an applicant is entitled to a patent, under the statutes, unless one of the prohibitory provisions of the statutes applies. The statutory requirements for patentability, broadly stated, are novelty, usefulness and unobviousness, as provided in 35 U.S.C. sections 101, 102, and 103. While it is true that proof that an invention is better or does possess advantages may be persuasive of the existence of any one or all of the foregoing three requirements, and hence be indicative of patentability, Congress has not seen fit to make such proof a prerequisite to patentability.¹

Appellant's invention, as defined in claim 10, has been held by the board to possess novelty over the disclosure of Chinnery et al. Just what the board thought about the pertinency of Norton is obscure but it seems to have regarded this reference as of little moment. Appellant in his brief here said that Norton was held by the board to have no bearing on the invention and the Patent Office brief said that the appellant was correct

1. A critical essay on the existing law has recently appeared under the title "A Proposal for: A Standard of Patentability; Consonant Statutory Changes; A Manual on Determination of Patentability," by Malcolm F. Bailey, 41 J.P.O.S. 192-225, 231-257. It advocates, as we understand it, that the present law should be changed to set up as the test for patentability, in place of the requirement of section 103 that an invention be unobvious, a requirement that the invention involve *progress*, which the author finds in the constitutional provisions. Congress has not seen fit to include in

the statutes, at any time during the past 169 years so far as we are aware, a requirement that each and every patentable invention shall involve "progress" in this sense, i. e., that each new invention must also be shown to possess some definite advantage over the prior art. The author relates the term "progress" to individual inventions and then gives it the connotation that each such invention should be a technical advance, improvement or betterment. The very making of the suggestion to change the law is an indication that the existing law is otherwise.

in so stating and that the court need not consider it. We are, therefore, virtually without any reference against claim 10 except Chinnery et al. and the rejection thereon is predicated solely on a theory of patentability we find to be outside of the patent statutes, namely, that the combination of claim 10 is, by reason of the use of spring retaining hooks instead of a series of bolts, *no better* than the combination of Chinnery et al. However intriguing such a ground of rejection may be, it is the duty of the tribunals of the Patent Office and of this court to apply the law as Congress has written it. While the provisions of the former R.S. 4893 may be said to have given the Commissioner some discretion in refusing to grant a patent on an otherwise patentable invention unless "the same is sufficiently useful and important," when the Patent Codification Act of 1952 was enacted, Congress removed this provision from old section 36 of title 35, now section 131. We take this as a further indication that it is the intent of Congress that patentability be determined solely by the provisions of sections 101, 102 and 103. We therefore reverse the board on this ground of rejection of claim 10.

If the issue before us were whether or not the spring hooks *are* better than the Chinnery et al. bolts—and we consider this in the event we have misapprehended the position of the board—we would hold that they are, on the basis of what is disclosed in the application. This retaining means seems to possess many advantages over screws. Similarly, if the board was intending to say that the hooks and the bolts are merely equivalent connecting means and that claim 10 is unpatentable because its combination differs from the prior art only in the substitution of an equivalent for one element in an old combination, then we would also have to disagree since we think it is clear that the use of the spring hooks produces a result quite different from the bolts of Chinnery et al. On the record before us no reference relied on shows any spring hooks nor does it contain any support for the con-

tention that bolts and spring hooks are equivalents.

For the foregoing reasons we reverse the rejection of claim 10.

The rejections of claims 1, 4, 7 and 10 are reversed.

Reversed.

MARTIN, Judge, concurs in result.

KIRKPATRICK, District Judge, dissenting, in which WORLEY, Chief Judge, joins.

I think that the board's rejection of claims 1, 4, and 7 should be affirmed. The central idea and the most important feature of these three claims, as well as of allowed claim 5, is the exertion of outwardly directed pressure upon the bore engaging portion of the sealing member, the result accomplished being to counteract the tendency of rubber to "set" or lose its resiliency and so become ineffective to prevent leakage. Jepson comes very close to completely anticipating this feature of the patent. All that would be necessary to make the anticipation complete would be to provide the Jepson seal with a shaft engaging portion and, incidentally, claim 7 does not specify any shaft engaging portion.

Of course, it was necessary that the seal be attached to the bore in a manner to prevent its displacement. Chinnery provides a flange and screws for this purpose and none of the three claims referred to calls for anything more specific than "means." Thus it seems clear that claims 1, 4, and 7 show no patentable novelty as against the prior art of Chinnery plus Jepson.

The only question is whether Jepson is in a nonanalogous art sufficiently remote from that of the application to put it beyond the probability that it would be considered by persons skilled in the art endeavoring to solve the problem to the solution of which the application is directed. I do not think that it is. Jepson was trying to meet exactly the same problem as the application under consideration, namely, to provide a compressible

seal which could be readily detached or inserted in a cylindrical bore but which would maintain a firm and leakproof seat on the bore when in place. I agree with the Solicitor's argument that one seeking to improve a machinery seal would reasonably be expected to investigate not only machinery seals but seals in other arts where similar problems would be encountered. See *In re O'Connor*, 161 F.2d 221, 34 CCPA 1055.

Claim 10 stands on a somewhat different basis. This claim entirely omits what I think, and have stated above, to be the heart of the application. In substance, claim 10 really amounts to no more than a claim for a hook formation to interlock with the housing of a bore in order to hold a press fit seal in place.¹ Chinnery discloses means to serve the same purpose consisting of screws.

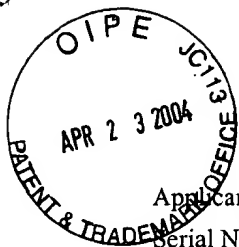
The board conceded that the combination disclosed in claim 10, consisting of spring hooks to fasten a press fit seal to

the bore, disclosed novelty over Chinnery but not patentable novelty.

I do not read the opinion of the board as predicated its conclusion of want of invention on the theory that in order to be patentable a combination must have some distinct advantage over the prior art. The board stated that there was nothing in the record to show that the substitution of hooks for screws produced any unexpected result or advantage and, therefore, concluded that the introduction of hooks did not create patentable novelty, but was a mere substitution of equivalents. The statement that the spring hooks of Ratti were no better than the screws of Chinnery was directed toward this point and seemingly was added to fortify the board's finding of equivalency rather than to propound a theory of patentability. I agree with the board that this claim, though it may show novelty over Chinnery, does not show patentable novelty, and I would affirm its rejection.

1. Chinnery discloses a press fit seal, but no one has suggested that there is anything new about such a device and the

specification of the application before us concedes that it is old in the art.



IRW # AF / 1733

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MATHIESEN Examiner: J. GOFF II
Serial No.: 09/485,097 Group Art Unit: 1733
Filed: MARCH 8, 2000 Docket: 12875.10USWO
Confirmation No.: 1469
Due Date: APRIL 18, 2004
Title: METHOD OF MANUFACTURING A COMPOSITE MATERIAL

CERTIFICATE UNDER 37 CFR 1.8:

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JGresens:PLSkaw